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Competing Visions of Aerospace Power:

A Language for the 21st Century

by

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The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College, the Department of the Navy, or the Department of the Air Force.

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This report argues that current members of US aerospace forces do not have a "language" or "lexicon" to differentiate one theory of airpower from another. To solve this problem, this report 1) describes the "prison house of language" that thwarted airpower theorists in the past, 2) provides a model to analyze airpower theory properly, and 3) reviews 15 different theories of airpower, with a primary emphasis on five post-1960 theorists (Irving Janis, Thomas Schelling, Ernest May, John Wraden, and Robert Pape).

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Executive Summary

This report argues that if you were to ask members of the military aviation community in America to describe various theories of airpower, they might say something highly generic about Giulio Douhet or the U.S. Army Air Corps Tactical School, but they would certainly say something vague about "bombs on target." In other words, current members of our aerospace forces do not have a "language" or "lexicon" to differentiate one theory of airpower from another. To solve this problem, this report 1) describes the "prison house of language" that thwarted airpower theorists in the past, 2) provides a model to analyze airpower theory properly, and 3) reviews 15 different theories of airpower, with a primary emphasis on five post-1960 theorists (Irving Janis, Thomas Schelling, Ernest May, John Warden, and Robert Pape).

Introduction

We begin with a proposition: the "Great Fall" is a common theme in modern historiography, and it appears in the works of pacifists and defense analysts alike. Pacifist religious historians like C. John Cadoux, for example, contrast the "purity" of the early Christian church, with its alleged emphasis on nonviolence and communalism, with the "corrupt" church that arose with Constantine the Great. It was Constantine, these historians argue, who forever tainted Christianity by making it a state religion, and thus formally linking it to a wicked Rome. In ***The Icarus Syndrome*** (1994), defense analyst Carl Builder follows Cadoux's example.[1] In Builder's case, however, the fallen institution is the United States Air Force and the lapsed source of unity, rather than pacifism and communalism, is the "theory-religion" of strategic bombardment, first codified by the U.S. Army Air Corps Tactical School in the 1930s.

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[1]Carl Builder, ***The Icarus Syndrome: The Role of Air Power Theory in the Evolution and Fate of the U.S. Air Force*** (New Brunswick, New Jersey: Transaction, 1994.

According to Builder, and a like-minded group of contemporary aerospace historians, American airmen had a holistic vision of air power up through the mid-1950s.[2] They had a theory (high altitude precision daylight bombardment against the key nodes of an opponent's economic infrastructure) that readily adapted itself to atomic warfare and deterrence theory. They also had a single means (the airplane) to apply the theory. As a result, airmen saw the ends and means of air warfare as one and the same. Since the means were unique to the ends, acceptance of the ends would ensure acquisition of the means, or so leading airmen like Thomas White and Curtis LeMay thought. This arrangement, however, did not last.

Beginning in the 1950s, the Air Force began to "fractionate into factions." The reasons included the following: 1) the Air Force did not transform its theory of

[2]See also Dennis M. Drew, "Two Decades in the Air Power Wilderness--Do We Know Where We Are?", ***Air University Review*** XXXVII (September-October 1986), 2-13; Colonel Thomas A. Fabyanic, USAF Ret., "War, Doctrine, and the Air War College--Some Implications for the U.S. Air Force," ***Air University Review*** XXXVII (January-February 1986), 2-29; Colonel Phillip S. Meilinger, USAF, "The Problem With Our Air Force Doctrine," ***Airpower Journal*** VI (Spring 1992), 24-31; Lieutenant General John W. Pauley, USAF, "The Thread of Doctrine," ***Air University Review*** XXVII (May-June 1976), 2-10; and Harold W. Winton, "A Black Hole in the Wild Blue Yonder: The Need for a Comprehensive Theory of Air Power," ***Air Power History*** 39 (Winter 1992), 32-42.

strategic bombardment into doctrine, preferring to leave the responsibility to its major commands; 2) Strategic Air Command, under the utilitarian influence of Curtis LeMay, fixated on the "how" of nuclear targeting rather than the "why" of airpower theory; 3) theory (and its definition) became the responsibility of civilian elites rather than "blue-suiters;" 4) the elites, rather than develop new paradigms, fashioned strategic bombing theory, as first defined by the Air Corps Tactical School, into increasingly elaborate theories of nuclear deterrence; 5) the Vietnam War split the Air Force into rival "strategic" and "tactical" camps, and the prominence of AirLand Battle Doctrine in the 1980s only deepened the schism; and 6) perhaps most importantly, with the introduction of ICBMs and space-based satellites, the Air Force soon possessed a diversity of ends and means.[3]

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[3]See Aaron L. Friedberg, "A History of the U.S. Strategic 'Doctrine'-1945-1980," ***The Journal of Strategic Studies*** 3 (December 1980), 37-7; Robert F. Futrell, ***Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force 1907-1960***, vol. 1 (Maxwell Air Force Base, Alabama: Air University Press, December 1989), 322, 367, 369, 373, 389, 392, 398-400, 405; Donald J. Mrozek, ***Air Power and the Ground War in Vietnam*** (Maxwell Air Force Base, Alabama: Air University Press, January 1988; Richard J. Overy, "Air Power and the Origins of Deterrence Theory Before 1939," ***The Journal of Strategic Studies*** 15 (March 1992), 73-101; George Quester, "Deterrence Before Hiroshima (New Brunswick, New Jersey: Transactions, 1986); Peter J. Roman, "Curtis LeMay and the Origins of NATO Atomic Targeting," ***The***

Builder fixates on the problem of ends and means in particular. He rightly notes that the means of air power came to include not just strategic bombers, but tactical fighters, military transports, missiles, and space systems. As a result of this new-found diversity, however, the long-standing assumption that air power theory and aircraft were one and the same thing finally came to an end. Air Force leaders (beginning with Generals White and LeMay) now had a choice to make--they could focus on the philosophy of air power supported by multiple means, or they could turn their back on theory and concentrate on preserving manned aircraft as the preferred instrument of air warfare. The airmen, in Builder's words, "revealed through their decisions more than their words-that their true affection was not for the theory of air power, but for the airplane."[4] In other words, the means became the ends. The disputes were no longer over air theory per se; instead they were over the mechanics of air

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Journal of Strategic Studies 16 (March 1993), 47; David Alan Rosenberg, "U.S. Nuclear War Planning 1945-1960," in ***Strategic Nuclear Targeting***, eds. Desmond Ball and Jeffrey Richelson (Ithaca, New York: Cornell University Press, 1986), 35-56; and Earl H. Tilford, Jr., ***Crosswinds: The Air Force's Setup in Vietnam*** (College Station, Texas: Texas A&M University Press, 1993).

[4]Builder, ***The Icarus Syndrome***, 35.

combat--missiles versus aircraft, manned versus unmanned systems, and space-based versus air breathing platforms. For each option, Builder asserts, there arose a special interest group committed to its own aircraft, weapon systems, and organizational scheme.

Air Force leaders continued to genuflect at the altar of strategic bombardment theory, Builder concludes, but only with the detached, empty formality of a nonbeliever. By the end of the Vietnam War, the Air Force no longer had a sense of community nor an integrated, unifying vision. Further, its major commands had become semiautonomous fiefdoms who tied their fortunes to aircraft and weapon systems rather than comprehensive theories of air power. As a result, the Air Force became (and remains) a collection of mutually suspicious tribes indifferent to the institution as a whole and catastrophically ignorant of its theoretical underpinnings.

Is Carl Builder's thesis valid, at least in its negative portrayal of theory-strategy-doctrine development? There is strong anecdotal evidence to support the thesis, but in one respect the question is moot. What matters is that Air Force leaders and thinkers believe it is true. For

example, the Strategic Aerospace Warfare Study (SAWS) Panel, which included among its 16 members Major General I.B. Holley, USAFR, ret. and Major General Charles D. Link, Headquarters, USAF, concluded in its October 4, 1996 White Paper that since 1945 the Air Force has suffered from "increasing fragmentation, erosion of focus, and certain negative perceptions due mainly to the legacy of 1941-1945."[5] (The breakdown of the service into "strategic" and "tactical" camps, among other factors, "worked against a unified, synoptic vision of American air power.")[6] As a result, the panel recommended the creation of a new vision of aerospace power that was shared, holistic, compelling, forward-looking, and suited for a spectrum of conflict.[7]

The SAWS Panel's conclusions, however, were not unique. Last September, Air Force chief of staff General Ronald Fogleman ruefully observed that he asked his subordinates what benefits the Air Force provided the nation, they inevitably said "***Global Reach, Global Power***, but they

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[5]The Strategic Aerospace Warfare Study Panel, "Aerospace Power for the 21st Century: A Theory to Fly By," White Paper, Maxwell Air Force Base, Alabama, 4 October 1996, v, 8.

[6]***Ibid.***

[7]***Ibid.***, 23.

couldn't really explain much more."[8] Few of his subordinates, it seems, had read the seminal 1990 document, but its "bumper-sticker" title had stuck with them. General Fogleman, however, did not blame his airmen and women for their superficial knowledge of theory and its distillation in doctrine, as found in ***Global Reach, Global Power***. The fault, he argued, lay with the Air Force itself. Since it had forgotten to be a "full time" service, it was no surprise that it had defaulted on its own doctrinal and, by extension, theoretical development, and that it had transferred its intellectual destiny to others:

> The fact of the matter is that we turned doctrine development over to Tactical Air Command and the Army's Training and Doctrine Command. We sent the whole task to the tidewater, Virginia area and the result was the doctrine of AirLand Battle. For a long period of time, we effectively lost sight of the fact that AirLand Battle was a subset of Air Power Doctrine and not ***the*** doctrine.[9]

Perhaps this abdication of responsibility was what Secretary of the Air Force Sheila Widnall had in mind when

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[8]General Ronald Fogleman, USAF, "A Vision for the 21st Century Air Force," ***http://www.dtic.mil/airforcelink/news/speech/current/A_Vision_for_the_21st_Centu.html***, December 13, 1996, 2. (Accessed January 17, 1997.)

[9]General Ronald Fogleman, USAF, "Aerospace Doctrine - More Than Just a Theory," ***http://www.cdsar.af.mil/doctrel.html***, May 1, 1996, 2. (Accessed May 24, 1996.)

she spoke recently of "the ingenuity and flexibility that is part of our birth right, but which we have neglected for years."[10] If not, it was certainly what Major General Charles Link, a key Air Force thinker, had in mind when he opined that "we don't have a common frame of reference to find a common vision."[11] The reason, as in the case of Carl Builder, was that the Air Force had come to focus on the "grammar" of war (its mechanics) rather than its "logic" (its cultural-political rationale and it theoretical underpinnings). As General Link observed:

> It is truthful to say airmen really have not been as articulate nor as diligent in explaining their combat perspective to anyone, much less the other services. We spent a lot of time improving our dive bomb accuracy, and our intercept reliability, but not enough time figuring out how to play in this larger thing we call warfare.[12]

It is the assertion of this paper that Carl Builder and his fellow travelers are right. Theoretical thinking in the United States Air Force enjoyed a Golden Age in the late

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[10]Secretary of the Air Force Sheila E. Widnall, "A Quiet Revolution," ***http://www.dtic.mil/airforcelink/pa/speech/current/A_Quiet_Revolutio.html***, October 29, 1996. (Accessed November 21, 1996.)

[11]Major General Charles D. Link, USAF, "An Airman's Perspective," transcript of presentation, January 7, 1997, 4.

[12]***Ibid.***

1920s and 1930s, but subsequently a "Great Fall" occurred. In its wake, a tendency "to disdain theory as something that resides only in academia, unsuitable for the world of the operator," took hold.[13] Airmen and women became "techno-twits," *i.e.*, they concentrated on the means of air warfare rather than its ends. To paraphrase Commander Joseph Gattuso, USN, they forgot that theories provided compact descriptions, clues for explanations, and tools for better work.[14] They forgot that theory helps trace the different tendencies that potentially exist in a situation; that it points out the different conditions that make it more likely for one tendency to prevail over another; and that it assesses the probability of one condition or tendency prevailing over another.[15] Finally, they forgot that theory:

> allows a senior commander to break free from the constraining bonds of petrified instruction, obsolete doctrine, and slavish adherence to 'how we fought the last war.' It helps the warfighter shape developing situations; it lets the leader dictate and act, not react. . . . it determines one's warfighting style,

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[13]Commander Joseph A. Gattuso, Jr., USN, "Warfare Theory," ***Naval War College Review*** XLIX (Autumn 1996), 113.

[14]***Ibid.***, 112.

[15]See Hans Morgenthau, ***Politics Among Nations: The Struggle for Power and Peace***, 5th ed., revised (New York: Alfred A. Knopf, 1978), 22.

> which in turn drives one's doctrine. A nation's doctrine determines the type, size, and character of its force structure; the nature, quality, discipline, and morale required of its personnel; and the type of support and direction needed from political authority.[16]

Theory, therefore, is the root of all that follows, and any institution that neglects it does so at its peril. That is why the SAWS Panel concluded its White Paper with an additional plea--not only does the Air Force need a new vision of aerospace power, it also needs independent, critical thinkers, *i.e.*, individuals capable of "dissecting the status quo, grasping the big picture, and generating new operational solutions tailored to the demands of future conflict."[17]

Unfortunately, and because of the reasons cited by Builder and others, the Air Force does not have enough of these individuals. There are too many "blue-suiters" who remain "techno-twits," *i.e.*, individuals preoccupied with tactical fundamentals and technology (the grammar of their profession) rather than with developing aerospace theory (the logic of their profession). Junior officers in

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[16]Gattuso, "Warfare Theory," 113.

[17]The Strategic Aerospace Warfare Study Panel, "Aerospace Power for the 21st Century: A Theory to Fly By," 25.

particular still confuse theory with tactics, nor can they clearly identify past and present theories of airpower, what they advocate, or what distinguishes one from another.

As a result, the purpose of this report is threefold. First, it will focus on the problem of language, both in the narrow and epistemological sense of the word. After 85 years, the average Air Force officer still lacks a totally effective language or lexicon to develop and analyze aerospace theory properly. The root causes of this problem, as Chapter One will highlight, are not the ones already offered by Builder and others. Instead, they are a long-standing dependence on Army-centered terms and definitions, and more importantly, the entanglement of airpower thinking within the two dominant "languages" of war created in the modern era--the pseudo-scientific language of 18th century physics and the Enlightenment, and the 19th century language of military romantics, who stressed the irrationality of war. Both lexicons were not totally "reality inclusive," and because they naturally centered on surface warfare, they trapped airpower theorists in a prison house of language. The airmen then compounded the problem by adopting the vocabulary of rationalism, as developed by Antoine-Henri

Jomini and others, instead of the more "reality inclusive" (but vague) language of the romantics, as exemplified by Carl von Clausewitz. As a result, air thinkers have always relied on adopted languages that not only circumscribed their thinking, but also included an increasingly inadequate collection of terms and categories to describe the nature of air warfare and its objectives. The result, therefore, was a growing intellectual paralysis in airpower theory.

Second, after providing a language-centered explanation as to why airmen and women lost the ability to articulate concepts of airpower employment, both to others and to themselves, Chapter Two will modestly attempt to repair the damage, at least in part. It will provide a "language" (*i.e.*, a process-oriented model) that budding aerospace theorists and planners can use to differentiate one theory from another, and to build their own theories in the future. The model is a combination of ideas and concepts developed by Dr. Robert Pape, Major Tom Ehrhard, and--however modestly--this author. Further, the model is adaptable. Since aerospace power is a pervasive attribute of air, land, and sea forces, the model approaches theory from a generic perspective. In other words, Army, Navy, and Air Force

aviators can all use it, and not just for the independent application of airpower in war. Yes, the model can provide the intellectual scaffolding for theories of employment across the spectrum of conflict, to include counter-WMD operations; conventional war; unconventional-irregular war; constabulary actions; special, single-mission operations; humanitarian operations; and information operations or fusion.[18] It can also, however, provide a "language" on how to conduct peacetime operations, including coercive diplomacy among states, the modification of international or domestic opinion, or the setting of legal-moral precedents.

Lastly, after providing a possible model on how to shape discussions about aerospace theory in the future, Chapter Three has a simple two-part goal--to demonstrate the use of the model and, in the process, expose interested airmen and women to 15 different theories of airpower. Since ***the purpose of the chapter is introductory "vocabulary enrichment" rather than minute analysis***, it will briefly compare and contrast 10 airpower theories developed prior to 1945, and then review five theories from 1951 to the present. In each case, the chapter will describe the theory

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[18]***Ibid.***, 29.

and then raise some issues or cautions that the reader might want to consider. However, these introductory discussions will focus on just one particular type of theory--the type designed for high-stakes coercion during war. The reason for this decision is simple--wartime coercion theories provide the richest examples of theory development because they remain the dominant reason for using aerospace power, despite the growing mission creep of the 21st century.

One

The Trap of Language

This chapter will focus on the problem of language, both in the narrow and epistemological sense of the word. It will argue that members of the military aviation community lack a totally effective language or lexicon to develop and analyze airpower theory properly. The root causes of this problem are a long-standing dependence on Army-centered terms and definitions, and more importantly, the entanglement of airpower thinking within the two dominant "languages" of war created in the modern era--the pseudo-scientific language of 18th century physics and the Enlightenment, and the 19th century language of military romantics, who stressed the irrationality of war. Air theorists then compounded their problems by adopting the vocabulary of rationalism, as developed by Antoine-Henri Jomini and others, instead of the more "reality inclusive" (but vague) language of the romantics, as exemplified by Carl von Clausewitz.

I. The Army-Based Grammar of Airpower.

Why do airmen and women still lack a "pure" vocabulary or lexicon to analyze air power theory? The root cause of these problems, according to at least one air power historian, is the long-standing dependence of Air Force officers on Army terminology.[19] The Army provided a ready vocabulary for early air theorists like Billy Mitchell, but by adopting a lexicon that centered on surface warfare, advocates of independent air power became trapped in a prison house of language.[20] The walls of this prison house included terms like battlefield surveillance, aerial artillery, ground interdiction, close air support, tactical fires, and others that not only circumscribed theoretical thinking, but also became an increasing source of tension over what terms and categories were appropriate to describe the nature of airpower and its objectives. For example, Major General R. M. Beck, Jr., Assistant Army Chief of

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[19]See Meilinger, "Towards a New Airpower Lexicon," ***Airpower Journal***, 39-47.

[20]A rare and limited exception was Englishman Hugh Trenchard, who self-consciously introduced titles and terms that were unique to the Royal Air Force, and thus affirmed its status as a separate (*i.e.*, independent) service. However, like his American counterparts, Trenchard did not purge the RAF of army-centered terms.

Staff, directed the interwar Air Corps to delete all references to "independent air operations" in a draft version of Field Manual 1-5, ***Employment of the Aviation of the Army***. A suitable substitute, in Beck's opinion, was "operations beyond the sphere of influence of surface forces."[21] More recently, The term "interdiction," also illustrates the point.

According to Joint Publication 1-02, ***Department of Defense Dictionary of Military and Associated Terms***, interdiction is "an action to divert, disrupt, delay or destroy the enemy's surface military potential before it can be used effectively against friendly forces."[22] Unfortunately, this definition ignores the true possibilities of an interdiction campaign. It wrongly presupposes the goal of war is to confront and destroy the enemy army, and that air operations are mere prologues to this necessary act.[23] In fact, aerial interdiction can itself be decisive, as demonstrated by the Battle of Khafji

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[21]Major General R. M. Beck, Jr., Assistant Army Chief of Staff, Memo for the Chief of Staff, March 29, 1939, 2, in AFHRA file no. 167.5-3 (1936-1939).

[22]Quoted in Meilinger, "Towards a New Airpower Lexicon," 40.

[23]***Ibid.***, 41.

in Desert Storm, and in the interruption of an enemy's airlift operations over an entire theater.[24] These types of distinctions, unfortunately, remain unclear to many working, everyday air officers. A surface perspective remains so imbedded in the terms used by airmen and women that a new, unmediated lexicon is necessary. "We should use revolutionary terms," John Warden rightfully observes, rather than "slight modifications of old terms."[25]

However, the problem with language not only involves a long-standing dependence on Army-centered terms and definitions, it also stems from the entanglement of airpower thinking within two dominant "languages" of war, to which we now turn.

III. The Rational or Neoclassical Language of Modern War.

In the modern era, the "scientific" language of Western military theory and strategy had its roots in Flavius

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[24]***Ibid.***, 40-41.

[25]John A. Warden III, unpublished letter to Ambassador Paul Wolfowitz, Under Secretary of Defense for Policy, September 15, 1992, 2. Colonel Warden may be only half right; there is utility in modifying old terms. Recent, helpful steps include transforming "air power" into a single word. "Airpower," its apostles argue, better conveys the indivisibility of air warfare and its "inherently" strategic nature. It also promotes air-mindedness in others.

Vegetius Renatus' ***Epitoma rei militaris*** (c.384-389). Vegetius' treatise was both a plea and a plan to revitalize the Eastern Roman army after its disastrous defeat by Fridigern's Gothic horsemen at the Battle of Adrianople (378 A.D.).[26] Unfortunately, Vegetius' military nostrums were too narrow in scope to save an already tottering empire. Nevertheless, the ***De re militari*** subsequently flourished as a practical and authoritative guide to medieval warfare in Europe.[27] (European scribes copied the text so frequently that over 320 manuscripts survive even today.) The reason for its popularity was simple--it was a "user friendly" compendium of ancient thinking on war. The ***De re militari*** included pithy extracts from the works of 30 largely forgotten military commentators, including Arrian, Frontinus, Polybius, Vitruvius, and others.

As a "how to" guide to war, Vegetius' compilation proved irresistible to the French Counts of Anjou and

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[26]For an in-depth analysis of this battle, which most military historians believe established the cavalry as the dominant arm of European warfare for the next millennium, see J. F. C. Fuller, ***A Military History of the Western World***, 3 vols. (New York: Funk and Wagnalls, 1954-1957; reprint, New York: Da Capo, 1987), vol. 1: ***From the Earliest Times to the Battle of Lepanto***, 261-76.

[27]See Charles W. Shrader, "The Influence of Vegetius' ***De re militari***," ***Military Affairs*** 45 (December 1981), 167.

English Plantagenet kings like Henry II and Richard the Lionhearted. These warriors studied carefully all five books of the ***De re militari***, but they particularly valued the 26 chapters on strategy, tactics, and the principles of war (or military procedure) contained in Book III.[28] This book then became even more important to Italian students of war after the success of the French king Charles VIII against the Italian city-states in 1494. In particular, the sorry performance of Italian mercenary armies in what is now generally acknowledged as the first military campaign of the modern era, piqued the interest of Nicolo Machiavelli, who served as an official of the city-state of Florence from 1498-1512.[29]

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[28]One of these rules was that military commanders should seldom resort to the "extremity" of battle. Instead, they should rely on "stratagems and finesse" to defeat an opponent in detail. "General actions" only increased the impact of chance in war, which increasingly defied rational control. The better option, therefore, was to rely on ancillary methods in war. They included either starving, surprising, or terrorizing an opponent into defeat. See Gérard Chaliand, ed., ***The Art of War in World History*** (Berkeley: University of California Press, 1994), 209, 217.

[29]Charles' army was "not fundamentally different in composition from that which Napoleon was to lead to the same battlefields three hundred years later." The army included Swiss pikemen, mounted cavalry, a detachment of bronze artillery, and sufficient funds to pay each soldier a regular wage. See Michael Howard, ***War in European History*** (Oxford: Oxford University Press, 1976), 19.

Machiavelli, whom William Shakespeare forever demonized in Anglo-American culture through the character of Iago, Othello's treacherous confidant, used Vegetius as a foundation for his own treatise, ***The Art of War*** (1521). Not only did the structure of Machiavelli's work mimic ***De re militari***, but portions of the latter text, including the principles of war found at the end of Book III, "were reproduced without modification by Machiavelli."[30] However, the Florentine philosopher was not interested in merely restating past pieties. Machiavelli sought instead to adapt the old laws of Roman warfare to the new realities of 16th century Italy. He argued this was possible because human history was immutable, and not necessarily diverse or unique. As a result, the classical military legacy of Rome represented a homogenous historical experience that provided infallible and generalizable rules of war that--if applied properly--reduced the relative impact of chance.[31] In other

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[30]Shrader, "The Influence of Vegetius' ***De re militari***," 170.

[31]See Azar Gat, ***The Origins of Military Thought: From the Enlightenment to Clausewitz*** (Oxford: Clarendon Press, 1989), 8.

words, military history was an educational tool; it provided formulaic lessons that inevitably rationalized war.[32]

Based on the recovered wisdom of the ancients and the updated prescriptions of Machiavelli, a rational or neoclassical language of war started to coalesce in Europe. It certainly appeared in Raimondo Montecuccoli's ***On the War Against the Turks in Hungary***, now more popularly known as ***Aphorism[s] on the Art of War*** (1670) and the first attempt to formulate a comprehensive theory of modern warfare in the West. (Significantly, the Austrian general drew upon 15 ancient, five late-medieval and Renaissance, and 22 early modern authors.)[33]

Although Montecuccoli acknowledged the inductive and incalculable elements of organized violence, his prevailing approach was rational. He saw that portions of war were becoming increasingly "scientific." Weapons fire, for

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[32]For a revisionist (and arguable) response to this traditional interpretation of Machiavelli's thought, see Timothy R. W. Kubik, "Is Machiavelli's Canon Spiked? Practical Readings in Military History," ***The Journal of Military History*** 61 (January 1997), 7-30.

[33]Gunther E. Rothenberg, "Maurice of Nassau, Gustavus Adolphus, Raimondo Montecuccoli, and the 'Military Revolution' of the Seventeenth Century," in ***Makers of Modern Strategy***, ed. Peter Paret, with Gordon Craig and Felix Gilbert (Princeton, NJ: Princeton University Press, 1986), 55-57, 62-63.

example, was a form of ballistics. Siege warfare was a symptom of poliorcetics, *i.e.*, the mathematical assault or defense of fortifications. As a result of these trends, Montecuccoli sought to develop a universal, proto-scientific paradigm of war and then support it with constant principles, axioms, and laws. The paradigm, based on Justus Lipsius' ***Six Books of Politics*** (1589), firmly put war "within a political framework, derived from political motives and directed towards political aims."[34] As a tool of nation-states, Montecuccoli argued further, war occurred within basic parameters, *i.e.*, it was a scientific process that led to predictable ends. The fundamental requirement for a successful commander was to decide when and where a particular axiom applied.

Raimondo Montecuccoli, along with contemporary military engineers like Sébastien Vauban and Blaise de Pagan, provided a significant link between the loosely prescriptive military theorists that preceded him and the rigid mechanical-mathematical interpretations of general war that subsequently appeared during the Enlightenment. The military rationalists of that era, including Frederick the

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[34]Gat, ***The Origins of Military Thought***, 16.

Great, Henry Lloyd, Heinrich von Bülow, Antoine-Henri Jomini, and the *Auteurs Dogmatiques* (the Marquise de Santa Cruz, the Marquise de Feuquières, Marshal Puységur, and others), all embraced the linear thinking of the New Physics or "Natural Philosophy" of the 18th century.[35] They categorically rejected Marshal Maurice de Saxe's characterization of war as "a science so obscure and imperfect" that "custom and prejudice, confirmed by ignorance,. . . [were] its sole foundation and support."[36] Instead, the soldier-scholars of the Enlightenment embraced the intelligible, mathematical logic of Isaac Newton and his disciples.[37] Like contemporary scientists, the men in arms

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[35]See, for example, Frederick the Great, ***Die Instruktion Friedrichs des Grossen für seine Generale von 1782***; Henry Humphrey Evans Lloyd, ***The History of the Late War in Germany*** (1766) and ***Military Memoirs*** (1781); and Dietritch Adam Heinrich von Bülow, ***Der Geist des neuren Kriegssystems*** (1799).

[36]Quoted in Major Edward S. Johnson, "A Science of War," ***The Command and General Staff Quarterly*** XIV (June 1934), 90.

[37]To characterize Newton as an irremediably linear and mechanistic scientist is unfair. As Barry Watts rightfully points out, it was overzealous disciples like Roger Boscovich (***A Theory of Natural Philosophy Reduced to a Law of Actions Existing in Nature***, 1758) and Pierre Simon de Laplace (***Philosophical Essay on Probabilities***, 1814) that linked the idea of linear predictability with 18th century mathematical physics. Newton did emphasize causality and long-term patterns, but it was Boscovich, Laplace, and others who popularized the idea that nature was entirely stable, rigidly determanistic, and required no divine intervention to work properly. See Barry D. Watts, ***Clausewitzian Friction and Future War***, Institute for National Strategic Studies

believed that reality was "out there." It was separate and distinct from those individuals who dispassionately (and scientifically) contemplated the world around them. Consequently, the soldier-*philosophes* argued, it was possible to develop an observationally based set of maxims, formalized in mathematics, to describe and explain a clockwork universe dominated by the Law of Cause and Effect.[38] (The law asserted that the same conditions always produced the same results, and that nature was so precise and harmonious that its laws never varied.)[39]

Further, within a uniform, cause and effect universe, state violence was also knowable and predictable. The military *philosophes* repeatedly referred to war as a "machine" or "mechanism." They agreed with Vegetius, Machiavelli, and Montecuccoli that warfare was reducible, calculable, and subject to universal and immutable

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McNair Papers, no. 52 (Washington, D.C.: National Defense University, October 1996), 108-12.

[38]R. David Smith, "The Inapplicability Principle: What Chaos Means for Social Science," ***Behavioral Science*** 40 (January 1995), 30; see also Michael Howard, ***Clausewitz*** (Oxford: Oxford University Press, 1983), 13.

[39]***Ibid.***, 108.

principles. The key, however, remained to identify those "statistical regularities" that shaped war.

Henry Lloyd, who coined the term "line of operations," consequently thought that two foundations of war were mathematics and geography. Those who understood "tangibles like topological and geographical measurements, march tables, supply needs, and the geometrical relationship of supply lines to fighting fronts (or of armies to their bases), would be 'in a position to initiate military operations with mathematical precision and to keep on waging war without ever being under the necessity of striking a blow.'"[40]

Heinrich von Bülow, in turn, stressed the quantifiable geometry of war to absurd lengths. He saw all military operations as a triangle with its apex as the objective. In a campaign or battle, the angle at the apex had to be less than ninety degrees for the opposing units, operating at the

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[40]Watts, ***Clausewitzian Friction and Future War***, 23. However, it is important to note that Lloyd--as a theorist--was not as hidebound as his contemporaries. In his ***Military Memories***, for example, he not only defined warfare as a science caught between geometry and morale, he also mused at length about the psychological dimensions of war. (What inspired men and women to fight? Did emotionalism decrease military efficiency?) Given his interests, one could argue that Lloyd was a precursor of the military romantics that followed in his wake.

other two ends of the triangle, to attack safely. (Bülow also believed that all military theorists required a precise, metrics-based "language" to formulate improved theories and strategies in the future.)

However, despite the contemporary prominence of the above soldier-scholars, it was Antoine-Henri Jomini who spoke and wrote the language of neoclassical rationalism best. Regardless of recent attempts by Professor John Shy and others to reverse his popular image as a hidebound systematist, Jomini was guilty of the charge.[41] He did provide a near endless series of prescriptions on how to succeed in war. How many factors defined strategy? Thirteen. How many maxims ensured effective lines of operations? Twelve. How many methods were there for effective retreats? Five. Yes, Jomini retreated from Bülow's extreme mathematical formalism, but his now legendary emphasis on permanent principles of war (including

[41]According to Professor John Shy, Jomini's low stature among current students of war is undeserved. He was more than a doltish, thick-witted foil to Carl von Clausewitz. He was an astute analyst of Napoleonic warfare who warned that his maxims, principles, and prescriptions were not holy writ. Nevertheless, they did form the irreducible core of what some have perhaps unfairly characterized as a "Betty Crocker" approach to war. See John Shy, "Jomini," ***Makers of Modern Strategy***, ed. Peter Paret, with Gordon Craig and Felix Gilbert (Princeton, NJ: Princeton University Press, 1986), 143-85.

mass, surprise, and economy of force), and on the omnipresent tactical requirement to concentrate offensive forces against a weaker opponent at a decisive point, clearly identified him as a rationalist shaped by the New Physics of the 18th century.

In multiple editions of his seminal ***The Art of War***, Jomini sought to domesticate warfare by robbing it of its true complexity, *i.e.*, he attempted to reduce it down to its fundamentals. In doing so, his increasingly popular writings reassured skittish European elites that Napoleonic warfare was not a murderous and revolutionary departure from the past. Yes, Napoleonic warfare involved whole nations in large and exhausting continental campaigns, Jomini admitted, but it was not a blind or insensate force that threatened the very foundations of European civilization. Instead, it was part of a continuum; it was part of a world of predictable change where "pure cerebration" still dominated over will, force, or luck.

Armed with theory, therefore, those who soberly (and properly) calculated the ends and means of human conflict would not only succeed, they would continue to refine war as a science. They would minimize the role of general fiction

and chance (and therefore anticipate future events), but only if they formalized "patterns from the past in such a way as to make them usable in the present as guides to the future."[42] In other words, the rationalists practiced Machiavelli's historical essentialism. A "lessons learned" approach to military history was both legitimate and helpful. Eternal verities always applied, provided one could identify them properly in a rational language of war.

III. The Irrational or Romantic Language of Modern War.

In response to the mechanistic approach of the neoclassicists, who agreed with Lord Grey that discussion without definition was useless, romantics or antirationalists like Gerhard von Scharnhorst, Helmuth von Moltke the Elder and Carl von Clausewitz provided a competing (and second) language for war. The competing language had its roots in the Romantic Rebellion of the late 18th and early 19th centuries, and it had a formidable (and seminal) spokesman in Gerhard von Scharnhorst.

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[42]Quoted from John Lewis Gaddis, "International Relations Theory and the End of the Cold War," ***International Security*** 17 (Winter 1992/93), 6.

The radical lexicon that Scharnhorst used to redefine war had three significant elements, among others. First, the Great Reformer repudiated the neoclassical characterization of war as a comprehensible part of a clockwork universe. Instead, war was a blind, demonic force. It was changeable, imponderable and immeasurable. It roiled with brutal, spiritual energy, and therefore involved a free play of opaque spiritual forces that defied rigid, one-sided systematization.[43] And since abstract formulas could not capture war's sheer diversity, one could not delimit it in exclusively mathematical (*i.e.*, mechanical) terms.

Second, Scharnhorst dismissed the historical essentialism of the rationalists. As a romantic, and therefore a believer in historicism, Scharnhorst thought that Machiavelli and his neoclassical disciples were wrong--the history of war was not homogenous; the past did not repeat itself. Instead, each epoch of armed violence was unique. It involved a unique interplay of "possibilities,

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[43]Johnston quotes Lord Grey in "A Science of War," 104. For a one-sided portrait of Clausewitz as a proto-chaos theorist who totally rejected the determinism of Jomini and his fellow rationalists, see Alan Beyerchen, "Clausewitz, Nonlinearity, and the Unpredictability of War," ***International Security*** 17 (Winter 1992-93), 59-90.

probabilities, good luck and bad" that militated against historical cycles or patterns.[44] Therefore, those who tried to foist personal or absolute schemata on the past were doomed to defeat. For example, it was futile, Carl von Clausewitz argued in the late 1820s, for 19th century warriors to examine prior wars for hoary "lessons learned." The similarities between past and present, he continued, did not extend beyond the War of the Austrian Succession (1740-1748). Prior to that historical point, there were no fixed military dictums that one could identify, catalog, and adapt to the present or future.

Third, Scharnhorst and his successors discarded the neoclassical view of nature (and war) as "out there." The world was not separate and distinct from the observer, and therefore amenable to objective analysis. Like Berkeley and Hume, Scharnhorst did not believe external forces or principles wholly defined reality. Human perception itself was a proactive and creative act; it interacted with the great "out there" to mold and define reality. Human experience, therefore, was a synthesis of the physical and the psychological, *i.e.*, the objective world was actually

[44]See Clausewitz, ***On War***, 86.

subjective, Scharnhorst believed. As a result, he reached the antirationalistic conclusion that war was a clash of wills or moral forces unfettered by scientific laws.

So, if war was demonic, unrepeatable, and a lethal blend of the subjective and objective, was the neoclassical compulsion to theorize dangerous? To romantics like Gerhard von Scharnhorst, Helmuth von Moltke the Elder, and Carl von Clausewitz the answer was "yes"--a general theory of war, as a "single conceptual system spanning all time," was impossible.[45] It would inevitably focus on the external forms of armed conflict and not capture the essential "inner nature of circumstances."[46] Further, it would succumb to the empty essentialism of those who sought the solace of maxims and rules.

Moltke the Elder, because he dreaded the above errors, later embraced Scharnhorst's lexicon of war. Since

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[45]Quoted in Antulio J. Echevarria, "Moltke and the German Military Tradition: His Theories and Legacies," ***Parameters*** XXVI (Spring 1996), 96; see also Peter Paret, ***Clausewitz and the State: The Man, His Theories, and His Times*** (Princeton, NJ: Princeton University Press, 1976); and Charles Edward White, "The Enlightened Soldier: Scharnhorst and the ***Militärische Gesellschaft*** in Berlin, 1801-1805," Ph.D. dissertation, Duke University, 1986.

[46]Quoted in Herbert Rosinski, "Scharnhorst to Schlieffen: The Rise and Decline of German Military Thought," ***Naval War College Review*** XXIX (Summer 1976), 85.

human conflict lacked general principles, Moltke argued, successful commanders had to depend on *Fingerspitzengefühl* ("fingertip sense"). This principle certainly applied to strategy, which Moltke preferred to define in thoroughly romantic terms--it was both a "free, practical, artistic activity" and a "system of expediencies."[47]

Carl von Clausewitz shared Scharnhorst and Moltke the Elder's hostility towards compulsive systematizing, but he also muted their absolutist vocabulary. As one of Scharnhorst's true disciples, Clausewitz recognized that war was a creative moral act. He rejected strategies of certainty that sought "static equilibria, consistent explanations, periodic regularities, and the beauty of symmetry."[48] He agreed that armed conflict was an intrinsically nonlinear phenomenon. He realized that, in addition to chance, the intangibles and dangers of war (i.e., its "fog" and "friction") were part of its essence, and not mere aberrations one tried to calculate away. As a

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[47]See Helmuth von Moltke, "Doctrines of War," in ***War***, ed. Lawrence Freedman (Oxford: Oxford University Press, 1994), 220-21.

[48]Beyerchen, "Clausewitz, Nonlinearity, and War," 86; see also Clausewitz, ***On War***, 149.

result, Clausewitz provided multiple (and metaphorical) definitions of war. War was a continuation of *foreign* policy by other means, and by a nation-state that spoke with a single voice. Additionally, it was a game of cards, a duel, an act of commerce, or an act of force designed to impose one's will. Lastly, it was a trinity or interplay of 1) primordial violence, hatred, enmity, and blind natural forces, as embodied in the people; 2) chance, probability, and the creative spirit, as embodied by the military commander; and 3) policy and reason, as embodied by the state.[49] By providing these diverse definitions of war, Clausewitz illustrated to himself and others that there was an alternative to the "scientific" language of war. As an antirationalist, he treated armed conflict like a prism. By rotating the prism in his hand and observing the ever shifting shards light that flashed fleetingly before his eyes, Clausewitz was able to express war's complexity with a larger vocabulary than Jomini and his fellow rationalists.

However, Clausewitz did not dismiss the impact of the external, physical dimensions of war. Unlike Scharnhorst and Moltke the Elder, he concluded that they did introduce

[49]Clausewitz, ***On War***, 85-87, 89, 148.

broad "statistical regularities" into armed conflict. By examining the phenomenon of war itself, and not seeking after empty maxims, principles, or laws, Clausewitz decided he could identify its essential elements and yet keep theory grounded in fact. As a result, his variety of romanticism kept "theory close to its empirical roots, not letting the language, logic, and polemics of theoretical discourse break away from the untidy, multifarious reality of actual warfare."[50] In short, Clausewitz's language of war lay between geometry and the irrational, and thus avoided many of the intellectual traps that entangled "pure" rationalist and antirationalist theorists of war alike.[51]

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[50]John Shy and Thomas W. Collier, "Revolutionary Warfare," in ***Makers of Modern Strategy***, ed. Peter Paret (Princeton, New Jersey: Princeton University Press, 1986), 843.

[51]Beyerchen, "Clausewitz, Nonlinearity, and War," 59. Clausewitz, of course, had his own limitations. For example, his lexicon of war did not adequately consider whether human violence, in addition to being a continuation of politics by other means, was also a cultural or biological activity. It did not acknowledge whether nations could stage thoroughly rational wars in service to thoroughly stupid (and ill-conceived) political objectives. Further, Clausewitz's military romanticism gave short shrift to combined operations between land and sea; coalition warfare (the dominant form of war in the 20th century); the technological, economic, and moral dimensions of war (note, for example, that Clausewitz thought soldiers were expendable in the service of the state); and guerrilla warfare, revolutionary warfare, or military operations other than war.

As a second, competing language of war, military romanticism served as an antidote to the false universalism and scientism of the rationalists. Where the rationalists aimed at fixed values, the romantics postulated that everything in war was uncertain, and calculations had to be made with "variable quantities;" where the rationalists emphasized the importance of external (*i.e.*, objective) forces in defining human conflict, the romantics highlighted the equal importance of psychological forces and effects; and where the rationalists focused on the one-sided, unilateral nature of war against a passive opponent, the romantics posited that war was "a continuous interaction of opposites."[52] Hence, by providing a second, competing language of war, military romantics, whether "pure" like Scharnhorst or pragmatic like Clausewitz, restored a necessary balance to modern theoretical speculations about war. They checked the arrogance of the rationalists, who wrongly saw their pseudo-mathematical, predictive schemata as synonymous with science: lastly, they weakened (but did not eliminate) the notion that rational, predictive concepts of war were somehow more truthful or "normal" than those

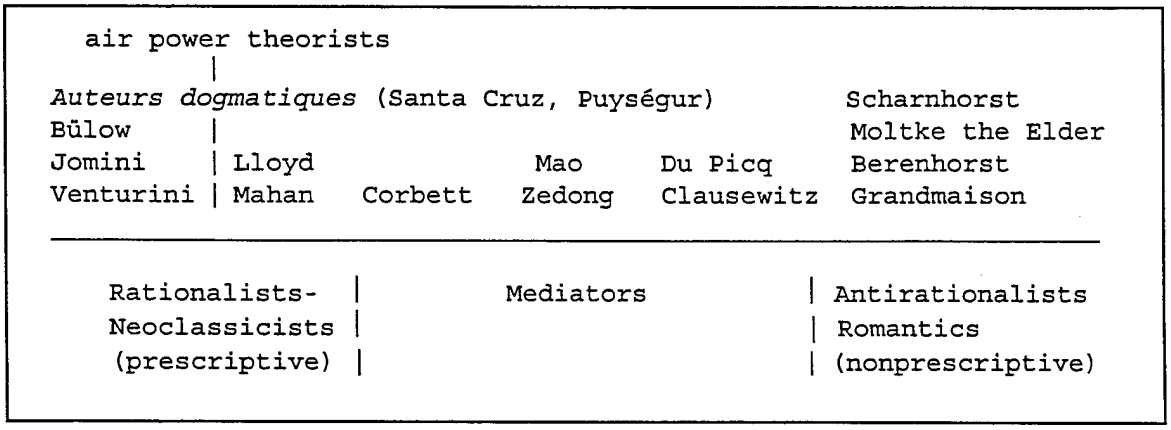
[52]Clausewitz, ***On War***, 136.

that emphasized the equal importance of intangibles (irrationality, chance, and probability, for example.)

With Clausewitz's premature death in 1831, Western military theorists had two specialized languages available to explicate war. Further, these languages, as elaborated by rationalists and antirationalists alike, established *the* framework for subsequent theoretical debate. As Figure 1 illustrates, military theorists in the modern era have exclusively employed either of these two languages, *i.e.*, they have been either prescriptive or nonprescriptiVe, or they have tried to reconcile both the regularities and irregularities of war within a middle ground of broad, flexible guidelines.

Figure 1

The Languages of Strategic Thought



However, the natural division of military strategists into rationalists, mediators, and romantics raises a fundamental question--where do air power theorists belong in the spectrum of modern strategic thought? Which "language," or combination of the two, did they use to define a nascent way of war? Unfortunately, to the detriment of Western air forces, seminal airmen and organizations like Giulio Douhet, Billy Mitchell, Hugh Trenchard, the "Bomber Mafia" of the U.S. Army's Air Corps Tactical School (ACTS), and World War II targeting organizations like the Committee of Operations Analysts (COA) and the Economic Objectives Unit (EOU) all adopted the Newtonian language of the neoclassicists, *i.e.*, they promulgated didactic, rationalist strategies.[53] The theorists and planners had more in common with the overdeterminism of Jomini and the *philosophes* than the probabilism of Clausewitz and the romantics. They emphasized unilateral offensive action against a largely passive (and defenseless) enemy;[54] they typically focused on

[53]Members of the "Bomber Mafia" included Robert Olds, Kenneth Walker, Harold Lee George, Donald Wilson, Robert Webster, Laurence Kuter, Haywood Hansell, and Muir Fairchild. In turn, the COA and EOU were basically a mix of military planners and civilian economists.

[54]In contrast, antirationalists like Clausewitz remind us that war is an interactive process--each combatant tries to

the architectural elegance and calculability of a theory rather than its veracity; they inferred that if a theory was symmetrical it must be right, despite the inevitable presence of biases, wishful thinking, and predispositions embedded within its original conception; and they deduced theories that--despite their scientific pretensions--were not necessarily supported by rigorous empirical proof. As a result of these weaknesses, three stubborn pathologies appeared in the "language" of air power theory.

Like their neoclassical predecessors, air theorists first sought to develop their own "scientific" lexicon of air warfare that would apply any time and place. The ACTS "Bomber mafia," for example, adopted "a Jominian, mechanistic view of war--a view of war as a mathematical equation whose variables can be selectively manipulated to achieve success."[55] Therefore, bomber advocates like Donald Wilson and Frank Andrews argued that any untried theory,

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impose his or her will on *an animate object that reacts*. Air power theorists up through John Warden have traditionally minimized the interactive nature of air warfare, primarily because of their fixation on the "inherently offensive" nature of the medium. As a result, the defense has typically received short shrift in air power theory. See Clausewitz, ***On War***, 149.

[55]Colonel Thomas A. Fabyanic, USAF Ret., "War Doctrine, and the Air War College--Some Implications for the U.S. Air Force," ***Air University Review*** XXXVII (January-February 1986), 12.

including the American theory of high altitude precision daylight bombardment against the critical nodes of an enemy economy, required "no firmer basis than reasoned logical thinking bolstered by a grasp of the fundamentals of the application of military force and the reactions of human beings."[56] This type of "good deductive reasoning," regardless of how canonical and prescriptive, was acceptable because air theorists defined the world in purely mechanical terms. Major General Frank Andrews, for example, noted that modern nations were "as sensitive as a precision instrument." If you damaged a vital part of a watch, the whole ceased to function.[57] Nino Salvaneschi, an Italian journalist who popularized the ideas of Giulio Douhet, agreed. He characterized the Great War as a "gigantic watchmaking factory" that was vulnerable to air attack, as did inventor-theorist Count Gianni Caproni, who compared airpower's possible disorganization of Austrian-German war

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[56]Lieutenant Colonel Don Wilson, "Long Range Airplane Development," November 1938, Air Force Historical Research Agency (AFHRA), Maxwell Air Force Base, Alabama, file no. 248.211-17, pp. 5-6.

[57]"Address of Major General Frank M. Andrews Before the National Aeronautical Administration," January 16, 1939, AFHRA file no. 248.211-20, p. 8.

production to breaking a watch by destroying its gears.[58] Again, the clockwork metaphor was a glaring clue that airpower theorists relied on a lexicon defined by the bogus scientism of the Enlightenment.

However, the theorists suffered from a second pathology--they made a fetish of quantification and prediction in war. For example, the American authors of AWPD-1, "the air plan that defeated Hitler," predicted in August 1941 that an initial consignment of 6,860 bombers massed against 125 German target sets would produce victory in 6 months. In turn, fighter aircraft advocate Claire Chennault predicted in 1942 that he could defeat Japan with 150 fighters and 42 bombers. Lastly, in early 1964 the Air Force and Defense Intelligence Agency developed OPLAN 37-64; it anticipated an American victory over North Vietnam in 28 days, provided the U.S. struck 94 "strategic" targets in the North. All three examples illustrated a propensity to confuse "bookkeeping" with analysis, even though analysis is

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[58]Nino Salvaneschi, ***Let Us Kill the War: Let Us Aim at the Heart of the Enemy***, 1917, AFHRA file no. 168.661-129, p. 31; Count Gianni Caproni, ***Memorandum on "Air War"***, 1917, AFHRA file no. 168.66-2, p. 2. Salvaneschi was an Italian journalist who popularized the theories of Douhet and Gianni Caproni in World War I. As a result, ***Let Us Kill the War*** accurately reflects their thinking at the time.

not a reductionist "firepower equation writ large," but must include an appreciation of context, combat efficiency, and other intangibles.[59]

As a last problem, air theorists have always relied on metaphors to buttress the "logic" of their arguments. Count Caproni, for example, expressed his opposition to battlefield air operations as follows: "It is not by chasing each bee in a garden that you. . . get the better of the swarm. You should rather destroy the beehive."[60] The ACTS "Bomber Mafia," in turn, "proved" the frailty of economic systems by comparing them to either a wispy spider's web or a tottering house of cards.[61] Lastly, Colonel John Warden unwittingly suggested that modern

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[59]The examples appear in James C. Gaston, ***Planning the American Air War: Four Men and Nine Days in 1941*** (Washington, D.C.: National Defense University Press, 1982); Rick Atkinson, ***Crusade: The Untold Story of the Persian Gulf War*** (New York: Houghton Mifflin Co., 1993); and General William M. Momyer, ***Air Power in Three Wars*** (Washington, D.C.: U.S. Government Printing Office, 1978). The quotation is from Benjamin S. Lambeth, "Pitfalls in Force Planning: Structuring America's Tactical Air Arm," ***International Security*** 10 (Fall 1985), 92.

[60]Caproni, ***Memorandum on "Air War"***, 2.

[61]ACTS bomber instructor Muir "Santy" Fairchild was typical. He understood the illogic of metaphors but still subscribed to the industrial web theory of strategic bombardment. See Kenneth Schaffel, "Muir S. Fairchild: Philosopher of Air Power," ***Aerospace Historian*** 33 (Fall 1986), 167.

societies were closed systems (and therefore vulnerable to collapse) by comparing them to the human body, which does not have the ability to substitute for serious deficiencies (or necessarily work around them) the way a society does. (Warden has also used the language of quantum physics in his writings but the basic architecture of his "Five Rings" model is quite rational, *i.e.*, it is Jominian.)

Unfortunately, metaphor-based theories have led to the faulty employment of air power in war. The theories, in addition to lacking empirical foundations, have failed to acknowledge a key point--armed conflict is a nonlinear, interactive process bedeviled by feedback loops, delays, "trigger effects," and qualitative changes.[62] As a result, airmen have tended to believe that a generic, metaphor-based strategy will work repeatedly, and thus challenge Winston Churchill's observation that "Air power is the most difficult of all forms of military force to measure, or even to express in precise terms."[63]

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[62]Beyerchen, "Clausewitz, Nonlinearity, and War," 63.

[63]Quoted in Andrew G. B. Vallance, "The Conceptual Structure of Air Power," in ***Air Power: Collected Essays on Doctrine***, ed. Vallance (London: Her Majesty's Stationery Office, 1990), p. 1.

As the above discussion has tried to intimate, air power thinkers were trapped between two languages. Yes, the romantic language of Clausewitz was more "reality-inclusive" than the language of Jomini, but our early thinkers, in order to develop "user friendly" concepts that would serve the interests of an infant service, adopted the rigid, narrow language of the rationalists. Second, regardless of what language air theorists would have adopted, both of them were land-centered. Their vocabulary was laced with army terms--"interdiction," "close air support," "fire support," and "battlefield," for example--that trapped the thinking of airmen even further. As a result, a fresh approach is necessary if airmen and women are to avoid the "prison house of language" that they currently inhabit--a prison house guarded primarily by the army. Let us turn to a possible solution to this problem in Chapter Two.

Two

A Language for Aerospace Power

The next task of this report is to provide a conceptual model (*i.e.*, an aerospace-centered "language") that can 1) identify past theories of aerospace power, and 2) shape the development of new hypotheses in the future. The basic model was the creation of Dr. Robert Pape, who attempted to develop a "value neutral ordering tool" that emphasized *process rather than prescription.*[64] (As already noted, process-oriented models of war are more "reality inclusive" than those based on content-laden rules or principles.) However, the Pape model did have limitations, as Major Tom Ehrhard subsequently observed. It did not account for the contexts of strategic planning; it did not address a full range of aerospace applications, just the severe ones; and it did not consider "the full range of outcomes which

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[64]See Robert A. Pape, Jr., ***Bombing to Win: Air Power and Coercion in War*** (Ithaca, New York: Cornell University Press, 1996); and Major Thomas P. Ehrhard, USAF, ***Making the Connection: An Air Strategy Analysis Framework*** (Maxwell Air Force Base, Alabama: Air University Press, 38.

strategists seek to achieve or avoid."[65] As a result of these limitations, Major Ehrhard improved upon Dr. Pape's model. A number of these improvements appear here, as do original contributions by this author. The resulting "language" of the framework may continue to rule out different courses of action, but as Don Herzog rightfully observes: "Any vocabulary will downplay certain possibilities, [or] will make them elusive or invisible or presumptively unacceptable;" embedded within any language, however, are "concepts, even ideological concepts, [that] open up new possibilities we wouldn't notice without them."[66]

To develop a proper "language" for aerospace theory, strategy, and perhaps even doctrine, one should perform a six-step process. The process is interactive and works from left to right (from planning to execution) and from right to left (from execution back to planning). As a result, the

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[65]Ehrhard, ***Making the Connection: An Air Strategy Analysis Framework***, 50.

[66]Don Herzog, "Interest, Principle, and Beyond: American Understanding of Conflict," in ***Behavior, Culture, and Conflict in World Politics***, eds. William Zimmerman and Harold K. Jacobson (Ann Arbor: University of Michigan Press, 1993), 234.

process is "reality inclusive;" it accommodates how things actually work in the use of aerospace power.

Step One: without exception, a theorist must first ask "what outcome(s) do I want from my use of aerospace forces?" In attacking an opposing state, for example, do I seek political concessions, a military defeat, or an actual change in government? If the first option, what particular concessions do I want? Will my opponent make these concessions if put under sufficient duress, or are my political goals unreasonable? If I concentrate on military success, do I want to annihilate my opponent in battle or merely neutralize his or her capability? Lastly, if I want a change in government, just what type of alternative do I want?

All of the above questions are legitimate, but they demonstrate only one type of outcome calculation. As Tom Ehrhard rightfully points out, the Doolittle Raid against Japan in 1942 was a successful application of independent airpower, but its primary goal was to raise domestic morale.[67] The Berlin airlift was equally successful, but

[67]See Ehrhard, ***Making the Connection: An Air Strategy Analysis Framework***, 19.

its goal was to check rather than reverse Soviet encirclement. Both examples illustrate that the consideration of outcomes in Step One is not a narrow, destruction-oriented wartime activity, nor is it solely preoccupied with the coercion of a hostile state to change its errant ways. The desired outcome could be anything, including economic disruption, changes in domestic or international opinion, continued compliance with the Powell Doctrine, the promotion of confidence building measures and collective security practices, and the creation of legal or moral precedents.

To realize so many different end states, the theorist or aerospace planner should address the issues identified in Figure 2.[68] The "receiver" in the figure can be an international organization, an ad hoc or formal alliance system, a regional block, a nation-state, a nongovernment organization (NGO), a terrorist network, a criminal syndicate and more. In turn, a reaction to a desired outcome is inevitable. If the reacting force is a nation-state at war, Clausewitz suggests that you at least gauge its "strength and situation," determine the "character and

[68] ***Ibid.***, 50 for the third question in Figure 3.

abilities of its government and people," and "evaluate the political sympathies of other states and the effect the war may have on them."[69] Without these steps, the reciprocal nature of war will soon trap you in its inevitable "fog" and "friction."

Figure 2

The Process of End State Determination

⇒ Do I seek informal as well as formal outcomes?

⇒ Do I seek short-term rather than long-term outcomes?

⇒ When I seek an outcome, what interactive impact or changes do I expect:

- domestically,
- on the receiver,
- on a third party/network/system?

⇒ What factors can any of the above three categories bring to bear against my desired outcomes?

Step Two: after establishing preferred outcomes and updating or replacing them as changing circumstances require, the next step is to 1) gauge the specific politico-

[69]Clausewitz, ***On War***, 586.

military capabilities (*i*.e., strengths and limitations) of those on the receiving end of your desired outcome(s), and 2) to measure the extent of your own ability to project aerospace power. Given that air theorists have historically overpromised airpower's ability to realize specific outcomes (at least initially), the determination of mutual capabilities is a vital and necessary step. (Consider, for example, the absence of fighter escorts and effective bombsights in the early phases of the Combined Bomber Offensive against Germany in World War II. Their absence, along with other limitations, sabotaged the revolutionary promise of M-Day warfare dominated by aerial *Kesselschlachts* against the vital centers of the German state.) However, when determining mutual capabilities, the aerospace theorist or planner must use a liberal definition of the word. As Figure 3 illustrates, there are many factors that help determine capability.

Figure 3

Determinants of Capability

Policy Directives	Readiness	Targets available
Force structure	Training	Domestic culture
Equipment performance	Weather	Joint requirements

The Environment	Tactics	Defensive counters
General Friction		

Step Three: according to Dr. Pape and Colonel Pat "Doc" Pentland, all theorists and planners must answer a third question (based on the first two) before they begin actual aerospace operations. Pape's question asks the following: should I adopt a ***punishment strategy***, which tries to push a society beyond its economic and psychological breaking point, a ***risk strategy***, which tries to do the same thing but at a gradually increasing rate rather than all at once, a ***denial strategy***, which tries to neutralize an opponent's military ability to wage war, or a ***decapitation strategy***, which destroys or isolates an opponent's leadership, national communications, or other politico-economic centers? (Note that punishment and denial strategies try to translate military effects into political change. A decapitation strategy, in contrast, does the opposite.)[70]

[70]For a discussion of each approach, see Robert A. Pape, Jr., "Coercion and Military Strategy: Why Denial Works and Punishment Doesn't," ***The Journal of Strategic Studies*** 15 (December 1992), 423-475.

Colonel Pentland, in contrast, asks the theorist to posit a similar (and yet different) question: should I adopt a ***disabling strategy***, which either disrupts an enemy's capabilities or undermines his resolve, a ***delaying strategy***, which uses threats or deterrence to preserve the status quo, or an ***enabling strategy***, which tries to create stability where it is weak or does not exist?[71] In terms of using air power, a disabling strategy includes direct attacks against specific targets. It also includes those ancillary functions (refueling, reconnaissance, etc.) that support air attacks. A delaying strategy involves air policing or an air embargo, while an enabling strategy provides military assistance programs.

Pentland understands that as one moves from disruption to stability, military options becomes less effective while economic, cultural, and political options become more effective. However, since Pape's strategies primarily have a high-stakes, wartime focus that involves a recognizable political actor, the virtue of Pentland's last category (his ***enabling strategy***) is that it accounts for the growing

[71]Pat A. Pentland, ***Theater Strategy Development***, unpublished manuscript in author's possession, 1993-94, 2-5.

number of non- or quasi-political outcomes that aerospace power tries to fulfill in peacetime. Therefore, a fluid, ad hoc mixture of Pape and Pentland's strategies may serve the needs of those seeking particular end states.

Step 4: with preferred outcomes now reconciled to actual capabilities, and with an appropriate strategy (or strategies) now in hand, the theorist or planner must focus next on the critical target/objective and mechanism nexus.

what targets or objectives are the most important? Are they more intangible in a peacetime setting rather than in war? In a high-stakes wartime setting, are they enemy leaders, "organic essentials" such as oil, information, and electricity, or an opponent's industrial infrastructure, population, or fielded military forces? Are these targets or objectives important individually or in combination? Unfortunately, airmen traditionally ask these specific (and critical) questions before resolving three broader, more fundamental issues.

Issue One: what aspects of an enemy's power should you challenge, either individually or together? As Colonel Pentland points out, theorists or aerospace planners could zero in on the ***sources*** of an opponent's power, which include

the military, industrial, or cultural foundations of a state; they could focus on the ***manifestations*** of an opponent's strength, which include the governmental and ideological projection of force; or they could concentrate on the ***linkages*** of an enemy's assets, which include the "human and material networks" that determine how effectively a nation organizes and employs its resources.[72]

Issue Two: after theorists or planners review what aspects of an enemy's power they want to challenge, they should then consider what generic strategy might work best. They could, for example, adopt a strategy that includes a ***direct*** approach, which emphasizes head-on assaults against enemy military capabilities; an ***indirect*** approach, which emphasizes maneuver warfare and the sapping of an enemy's will to fight; and/or a ***rapid transition*** approach, based on John Boyd's Observation-Orientation-Decision-Act (OODA) Loop, which tries to disrupt or retard an opponent's decision-making calculus in relation to your own, thus

[72]***Ibid.***, 3.

making him or her increasingly deaf, dumb, and blind to your own behavior.[73]

On the other hand, the theorist or planner might adopt an ***inside out*** or an ***outside in*** approach. In the ***outside in*** method, as embodied by John Warden's Five Rings Model and every other "strategic" bombing theory of airpower, the attacker strikes vital targets deep within enemy territory. Fielded military forces, Warden metaphorically argues, cannot operate effectively without a "brain" directing them. If you sever the "brain" (*i.e.*, enemy leadership), you incapacitate an opponent from the "inside out."

An ***outside in*** strategy, in contrast, has dominated land warfare for the last 5,000 years. It necessarily focuses on the forces that surround and protect the inner core of an opposing state. By eliminating these forces, which can include the general population and the military, the planner can endanger the fountainhead of enemy power. Dr. Pape's theory of aerial coercion (see below) is a recent variation of the traditional ***outside in*** approach.

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[73]See Major David S. Fadock, ***John Boyd and John Warden: Air Power's Quest for Strategic Paralysis*** (Maxwell Air Force Base, Alabama: Air University Press, 1995.

Issue Three: after determining which generic strategy to adopt, the theorist or air planner might ask, particularly in wartime, "what level of destruction or disruption do I want?" As Kevin Williams observes, there are a hierarchical series of effects that occur in air targeting. A "first-order" effect involves the physical or functional destruction of a target within a broader system. If accomplished at a sufficient rate, it yields a "second-order" effect, which degrades a system's overall ability to operate. An opponent will typically respond to this effect by trying to work around it and continue to support his or her military strategy. In a "third-order" effect, an enemy nation can no longer compensate for the damage it is experiencing; work-arounds or substitutions no longer work. As a result, the nation must change its military strategy. Finally, a "fourth-order" effect signals victory, *i.e.*, the imposition of your political will on your opponent. You produce this outcome by "achieving three-order effects in a unique and situationally dependent set of target systems."[74] To reach this point, however, air planners must always

[74]Williams, ***In Search of the Missing Link***, 5-7.

consider what level of destruction (or disruption) they ultimately desire.

With the above three issues properly resolved, aerospace planners could determine what specific target set(s) or objectives to attack. According to Carl Kaysen, they could rely on six criteria, particularly when dealing with economic targets.[75]

First, they could consider the military importance of a target. This step might include "a rough classification of the value to enemy military operations of all types of equipment and supplies used by the enemy forces."[76] (The classification, however, is relative to the strategic situation, and to the tactics and doctrine of your opponent.)

Second, the planners might ask "what proportion of the target is put to ***direct*** military use?" The higher the proportion, the more important the target may be, especially in a short war scenario.

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[75]See Carl Kaysen, ***Note on Some Historic Principles of Target Selection*** (Santa Monica, CA: RAND Corporation, Project RAND Research Memorandum 189 (RM-189), July 15, 1949.

[76]***Ibid.***, 2.

Third, there is the criterion of depth; it measures the military importance of a target in terms of time. "Average depth," according to Kaysen, "is a time concept designed to measure the average interval of time elapsing between the output of a good or service. . . and its appearance. . . in a finished military item in the hands of a tactical unit."[77] Typically, "the measure of depth is important as an indication of the time available to the enemy for the organization of substitute consumption, alternate production, and so forth, before he suffers military damage."[78] Again, in a short war scenario a target with little "depth" may require immediate attention.

Fourth, one should determine the economic vulnerability of a target, which can include the following--substitutability for processes and equipment, substitutability for products or services, process and plant layout vulnerabilities, an opponent's recuperability, and ratio of capacity to output.

Fifth, the planner might consider the physical vulnerabilities of a target set. What type of construction

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[77]*Ibid.*, 4.

[78]*Ibid.*, 5.

is it? What is it made of? Does it contain additional machinery, stocks of combustible or explosive materials, or other significant items?

Finally, air planners might want to accurately determine the location and size of a target set.[79] Only then is it possible to decide which ***specific*** targets require destruction or disruption.

Step 5: after an air theorist or planner determines what aspects of an opponent's strength or weakness to assail, what targeting framework to adopt, what order of effects to seek, and what actual target sets or objectives to assault, they must answer a question that has an intimate, Janus-faced relationship with targeting--what mechanism(s) do I expect an aerospace assault or operation to trigger? In other words, what changes or outcomes do I expect as a result of an aerospace action? Will it, for example, cause economic dislocations, a loss of moral or legal standing, a political division among allies, a palace coup, a military retreat, a popular revolt, or a decrease in the number of political risks an enemy is willing to take? Will it isolate ruling elites from their political base (or

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[79]***Ibid.***, 5-6.

from fielded military forces) and thus cause operational paralysis, politically and militarily? Unfortunately, our ability to link aerospace ends to desired outcomes (*i.e.*, to accurately identify mechanisms and their results) remains poor. Over the last 80 years, airmen have become very effective in maximizing "first-order" bombing effects. In fact, decisive physical and functional destruction has become a synonym for targeting efficiency. As stated before, however, the linkage between destruction and outcomes remains unclear. Woven into each theory of air power are *a priori* assumptions about mechanisms that are not always obvious or necessarily wrong. They are, nevertheless, a collection of biases and belief systems more than they are empirical proofs. As a result, airmen and women have not succeeded historically at recognizing mechanisms for what they are.

To succeed in the future, they first need to define their assumptions closely. Second, they need to create targeting groups like those formed in World War II, but instead of fixating on economics and mathematics, the groups must be broadly multidisciplinary in scope and include a variety of civilian specialists.) Finally, in order to apply

the leverage (or mechanism) of aerospace power properly, they should identify centers of gravity above and beyond traditional target sets. These centers of gravity could include political, economic, social, or cultural beliefs and assumptions. They could also include government philosophies, social structures, special interest groups, or demographic factors. Only an expanded appreciation of these types of COGs (and the assumptions behind them), will enable theorists or planners to understand the dynamic, Janus-faced relationship between targeting and mechanisms.

Step 6: as a final step in creating a "language" of analysis for aerospace power, it is appropriate to address the issue of timing. Given the growing importance of aerospace applications in peacetime, the movement of war away from theater-level conventional operations and towards a spectrum of violence, and the increasing emphasis on asymmetric disruption and paralysis in warfare, the proper timing of an aerospace action matters today like never before.

There are three aspects to timing, however. First, there is the traditional question of when a move or assault should occur? Should it be incremental, sequential,

cumulative, or simultaneous? By answering these questions, the air planner determines how to use time and space properly. The planner, for example, may choose to conduct a series of measured, escalatory air attacks. If Thomas Schelling is correct, war is a form of vicious diplomacy; it retains a negotiatory character. The deliberate pauses of a gradualist campaign allow opponents to assess the growing costs and risks of war. As a result, they can exchange proposals and counterproposals, and possibly reverse course.

On the other hand, and particularly in warfare, the air planner could conduct simultaneous assaults against multiple targets and levels of conflict. With the advent of advanced data links and precision guided munitions (PGMs), Colonel John Warden argues, performing simultaneous (and devastating) air attacks are now possible. The sheer speed of the attacks could disorder and confuse an enemy to the point of panic and mental paralysis. As a result, those under attack could capitulate, not because of traditional battlefield casualties, but because of the disordering of command structures through the compression of time and space. (This aspect of Warden's theory owes an obvious debt to John Boyd's OODA Loop concept.)

However, timing also applies to the synchronization and coordination of aerospace forces with other tools of national power. By orchestrating the temporal use of air assets with special operations units, for example, military forces can create combat synergies that are greater than the sum of their parts.

Lastly, wartime timing can involve a concept little appreciated by past air leaders--a secure reserve force. By withholding a portion of air and space assets from initial operations, and then releasing them when first-echelon force reconstitute, aerospace planners can provide a steady stream of pressure in war, rather than traditional waves of pressure.

In conclusion, by focusing on the above six categories --desired outcomes, capabilities, strategy(ies), targeting, mechanisms, and timing--theorists and planners can avoid a common mistake--fixating on the "how" of air theory, strategy, and even doctrine, rather than the "why." Further, the steps are not prescriptive; instead, they provide the "language" (*i.e.*, the intellectual scaffolding) for a budding theorist or planner to build new theories and concepts of aerospace employment. However, as already

suggested, the cause-and-effect relationships between targeting, mechanisms, and outcomes remains under dispute. As in the past, a clear explanation of this relationship remains the Holy Grail of air power theory, and in the case of multiple theories (provisional or not), the answers provided are very different indeed, as this monograph will now illustrate.

Three

Fifteen Competing Theories of Airpower

Thus far, this report has identified a historical problem--the prescriptive, land-centered language of aerospace power--and the negative impact it has had on the development of air power theory. Second, the report provided a new "lexicon" (*i.e.*, a reality-inclusive, process-oriented model) to help distinguish one theory from another, and to help develop new hypotheses in the future. The broad aim of this chapter is to demonstrate the use of the above model and, in order to reverse the professional aphasia that afflicts aerospace professionals even today, review fifteen separate theories of aerospace power. However, since ***the purpose of the chapter is introductory "vocabulary enrichment" rather than minute analysis***, it will broadly compare and contrast 10 airpower theories developed prior to 1945. Then, it will turn to five airpower theories, found either explicitly or "in between the lines," in the works of Irving Janis, Thomas Schelling, Ernest May, John Warden, and Robert Pape. (Schelling and Warden's

theories are explicit. In the case of Janis, May, and Pape the reader must extrapolate their "theories" from musings on related subjects.) In each case, the chapter will describe the theory and then raise some issues or cautions that the reader might want to consider. However, as pointed out in the introduction, these impressionistic discussions will focus on the dominant (and most germane) type of aerospace theory developed to date--the one designed for high-stakes coercion during war.

I. Airpower Theory Prior to 1945.

The Theories: historically, airpower theorists did not agree over one critical question--how did you persuade an opponent to abandon key political goals and objectives in wartime? On what was then identified as the "strategic" level, the question spawned three schools of thought.

First, those who advocated a ***Punishment Strategy,*** which sought political concessions or changes in behavior by terrorizing civilians from the air. Members of this group included Giulio Douhet, William "Billy" Mitchell (after 1925), Hugh Trenchard, and Arthur "Bomber" Harris.

Second, those who advocated a ***Risk Strategy***, which aimed at inexorably depriving an enemy of the industrial

capacity to wage war.[80] Members of this group included Gianni Caproni, Nino Salvaneschi, the Air Corps Tactical School, and members of two Allied targeting groups in the Second World War, the Committee of Operations Analysts and the Economic Objectives Unit.

Third, those who advocated a ***Denial Strategy***, which fixated on the destruction of fielded military forces. Continental military establishments like the German and Russian general staffs supported this option in order to subordinate airpower to pressing army needs.

The Issues and Problems: When it came to implementing the above strategies, other differences of opinion arose. Everyone but Douhet agreed that limited technology restricted airmen to serial attacks. Everyone agreed further that the problems of selecting appropriate target systems, and the specific targets within them, were of overriding importance. (By necessity, targeting was a matter for continued study, refinement, and reevaluation.)[81] However, as Figure 4 illustrates, those who argued over the

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[80]Salvaneschi, for example, claimed that the Allies "must aim, not at the army that fights, but at the factories of Essen." See Salvaneschi, ***Let Us Kill the War***, 38.

[81]See Major Kevin E. Williams, ***In Search of the Missing Link: Relating Destruction to Outcome in Airpower Applications*** (Maxwell Air Force Base, Alabama: School of Advanced Airpower Studies Thesis, June 1994), 4.

relative merits of the above three strategies also quarreled over what specific target sets to attack. There existed only limited agreement on what constituted generic centers of gravity in war and what mechanisms they would trigger if attacked.

Figure 4

Representative Theories Prior to 1945

Theorist(s)	Political Outcome	Target Set(s)	Mechanism
Caproni/ Salvaneschi	Military defeat	Major munitions factories	Destroy equilibrium in equipment
Douhet	Change government or its behavior	Population (cities)	Revolution
Mitchell	" " "	Vital centers	Civil Uprising
Trenchard (in 1920s)	" " "	war materiel, transportation, communications	Operational paralysis
Slessor	Military defeat	Troops, supplies, production	Interrupt or destroy equip. and supplies
ACTS	Change government or its behavior	Key econ. nodes (industrial web)	Social collapse, break popular will
Harris	" " "	Population (cities)	Fear, lost morale
Wilberg, Weber, & the Ger. General Staff	Military defeat	Enemy field army	Battlefield breakthrough, army destruct.
COA	" " "	Munitions plants,	Materiel shortages
EOU	" " "	Oil/transpo.	Operational paralysis

Unfortunately, those who quarreled confidently over target sets and mechanisms had limitations in their own theories. For example, those who advocated a punishment strategy against an opponent's civilian population either ignored or minimized the following six problems.

1. Psychological effects are often only temporary.

2. The effect of aerial terrorism on civilians is usually emotional passivity rather than revolutionary action.

3. If civilians feel their government is making a good faith effort to protect them from air attacks, they turn their anger outward against the attacker.

4. Authoritarian regimes are indifferent to popular suffering and will not easily respond to domestic political pressure.

5. Because of air defenses and work-arounds, populations have time to adapt to their suffering.

6. Population attacks ignore a growing number of legal and moral precepts designed to ensure noncombatant immunity.

In turn, those who advocated a risk strategy against enemy economies had their own methodological problems, including the following.

1. Attackers tend to mirror-image, *i.e.*, they confuse the features of their own industrial or economic infrastructure with the critical vulnerabilities of an opponent's system.

2. Economies are not brittle. They typically do not have clear breaking points, *i.e.*, they do not snap if put under duress. Instead, economies lose their vitality like a balloon with a slow leak.

3. Air attacks against an economy are an indirect way to break a people's will to resist. However, the link between economic deprivation, political alienation, and changed political behavior, remains unclear.

4. Attackers have difficulty determining if an economic target is functionally destroyed, *i.e.*, it doesn't work, as opposed to being physically destroyed. (The distinction is an important one when deciding what target sets to revisit.

Lastly, those who supported a denial strategy against an opponent's fielded military forces collided with the biases and assumptions listed in Figure 5, which American, British, and Italian bomber advocates fervently supported in the interwar years.

Figure 5

Nine Anti-Army Propositions Regarding Airpower (Pre-1945)

1. Aircraft are omnipotent; they can destroy any objective and are invulnerable to any defense.

2. Command of the air is a necessary and sufficient condition for military victory.

3. It stems from an Air Force "independent of surface forces and composed of maximum bombing power and the requisite fighting power."

4. The independent Air Force must be a force-in-being.

5. It should always operate in mass.

6. It must devote all its efforts to the offensive, *i.e.*, it should not divert itself to support auxiliary aviation.

7. The proper initial target of the independent Air Force is the enemy's Air Force, especially its bases and places of production.

8. After achieving command of the air, "target selection depends on the situation of the moment and requires careful consideration."

9. Surface forces should have a defensive function; the Air Force performs the major offensive action.

And if working against the above orthodoxies were not enough of a problem for those who supported army-centered operations, they also had to answer three recurring questions--who actually controlled air assets in battle, who decided what roles and missions those assets would perform, and who selected the targets they attacked? To those who believed army commanders did not understand the value of theater-level air support against targets away from the immediate battlezone, army-centered theories of airpower were ill-advised, if not heretical.

In addition to having limitations of their own, punishment, risk, and denial-oriented air theories also

shared some problems. They were, for example, hopelessly Newtonian and Jominian in outlook. In other words, they assumed war was an objective activity in a cause-and-effect universe where your external means unilaterally impacted another's behavior. As a result of these assumptions, the "how," "what," and "where" of targeting received much more attention than the "why." No theorist, school, or planning group adequately explained how destroying a particular target set would trigger a specific reaction that yielded a desired political outcome. (In other words, if I use X, Y will happen and cause desired change Z.) Douhet, for example, ultimately ***assumed*** that ruthlessly attacking an enemy's population would inspire it to revolt, and thus lead a government that cared about the suffering of its people to change or discontinue its hostile political behavior. Salvaneschi and Caproni equally ***assumed*** that destroying an opponent's munitions plants would create equipment imbalances on the battlefield, and thus ensure an opponent's military defeat. John Slessor, in turn, ***assumed*** that the operational paralysis of fielded military forces would yield similar results.

In all cases, however, the pre-1945 theorists-planners ultimately hit an intellectual wall. The targeting process was (and remains) "civilian" in nature (*i.e.*, it depends on a variety of academic and professional disciplines). Unfortunately, Douhet and his successors were largely ignorant of politics, economics, cultural anthropology, sociology, comparative religion, and other related fields. Without a holistic, multidisciplinary approach, therefore, their targeting strategies yielded to wasteful trial and error in war, particularly in the sphere of economics. The cause-and-effect relationship between destroying parts of a target system and changing an opponent's politico-military behavior remained unclear, as it still does today. In fact, a clear exposition of this relationship remains the Holy Grail of air power theory.

II. Five Modern Theories of Airpower.

As in the case of the ten theories of early airpower identified in Figure 4, the four modern theories detectable in the writings of Irving Janis, Thomas Schelling, Ernest May, and John Warden require working propositions (*i.e.*, key assumptions) to act as their intellectual foundations. Figures 6 and 7 identify what some of these key assumptions

might be, both in an independent and joint setting. It is important for the reader to keep them in mind as this chapter now proceeds to broadly describe five additional theories of airpower and some of the strengths and weaknesses they harbor.

Figure 6

Nine Strengths of Independent Airpower

1. Independent airpower deters, constrains, or eliminates enemy options via surveillance and air-space dominance.

2. It directly attacks enemy strategy(ies) and weaknesses (COGs).

3. It disrupts or destroys hostile operations through precision strikes against an enemy's instruments of power.

4. It achieves enough attack intensity--through simultaneous operations at all levels of war--to limit enemy adaptations or substitutions.

5. It minimizes collateral damage, casualties, and unintended consequences.

6. It enables friendly forces to operate *within* an opponent's decision-making cycle.

8. It denies an opponent's war aims.

9. It reduces an opponent's capacity to resist your will.

Figure 7

Five Strengths of Airpower in a Joint Setting

1. Airpower in a joint environment reduces casualties, costs, risks, and follow-on commitments by offering more economical substitutes for surface actions.

2. It directly and independently engages an opponent, far and near.

3. It provides a theater-level perspective on campaigns as a whole.

4. It shapes and determines the conditions in which surface forces operate.

5. It shapes the course, tempo, and outcome of all operations in a theater.

1. The Leadership "Theory" of Irving Janis.

The Theory: Air War and Emotional Stress (1951) was a RAND Corporation study conducted by Dr. Irving Janis to evaluate the psychological effects of air warfare on civilian populations. By analyzing the emotional responses, attitudes, and behavior of British, German, and Japanese civilians subjected to air bombardment in World War II, Janis drew two noteworthy conclusions about the impact of air power on noncombatants.

First, the physical magnitude of an air attack was important to those who experienced it directly. Heavy bombing raids, in terms of size and tonnage, temporarily raised political apathy and the distrust of an afflicted population towards its political leaders.[82] Such raids, however, were most effective if sporadic and unpredictable, thus depriving an opponent the opportunity to adapt psychologically for even short periods of time.[83] By

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[82]Irving L. Janis, ***Air War and Emotional Stress*** (Westport, Connecticut: Greenwood Press, 1951), 87, 140, 143. See also: Constantine Fitzgibbon, ***The Winter of the Bombs*** (New York: Norton, 1957); Hilton P. Goss, ***Civilian Morale Under Aerial Bombardment 1914-1939***, 2 vols. (Maxwell AFB, Alabama: Documentary Research Division, Air University Libraries, Air University, 1948); Jack Hirshleifer, ***Disaster and Recover: A Historical Survey*** (Santa Monica, CA: RAND Corporation Research Memorandum (RM) 3079, 1963); Charles Ikle, ***The Social Impact of Bomb Destruction*** (Norman, Oklahoma: University of Oklahoma Press, 1958); Hans Rumpf, ***The Bombing of Germany***, trans. Edward Fitzgerald (New York: Holt, Rinehart and Winston, 1963); and Richard M. Titmuss, ***Problems of Social Policy: History of the Second World War, United Kingdom Civil Series*** (London: Her Majesty's Stationery Office, 1950).

[83]Although regular and unvarying air assaults do not increase civilian resentment against an attacker, irregular and variable assaults do the opposite. A logical question then follows: is it worthwhile for an air planner to lower an opponent's ability to adapt (via sporadic air attacks) even though it raises his or her anger? Unfortunately, the question itself is too simple--if no active or passive defenses exist, or if demands for retaliation go unheeded, civilian hostility can shift back from the attacker to those domestic leaders who fail to provide organized support (adequate shelters, antiaircraft barrages, or relief measures) for their people. Since the aggression of a bombed population can be "diffuse and labile," and often equally directed at all sources of authority, keeping an adversary off balance with irregular bombing may be a viable politico-military option, despite the possible rise in externally-directed aggression it may inspire. See Janis, ***Air War and Emotional Stress***, 118, 127, 130, 135-37, and Alexander

disrupting familiar socio-political patterns, Janis concluded, irregular air attacks would dishearten an opponent.

Second, Janis concluded that a near-miss experience (*i.e.*, a direct exposure to danger or its immediate effects) heightened fear and lowered morale. In Janis's opinion, morale deteriorated most in near-miss groups that narrowly escaped the effects of severe air bombardment.[84] The critical variable here was not the expected level of bombardment, but the degree of one's personal involvement in an air attack. Remote-miss experiences actually calmed fears while intense, terrorizing near-miss experiences appreciably lowered an individual's emotional ability to adapt.[85] In fact, anyone who repeatedly experienced narrow escapes, Janis observed, "may become defeatist, his loyalty to his group may weaken and he may be less willing as a result to work for the achievement of his group's aims."[86]

George, "Emotional Stress and Air War--A Lecture Given at the Air War College," November 28, 1951, 19, in AFHRA File No. K239.716251-65. For additional support that irregular bombing worked best against Germany, see K. W. Yarnold, ***Lessons on Morale to be Drawn From Effects of Strategic Bombing on Germany: With Special Reference to Psychological Warfare***, Technical Memorandum, ORO-T-2 (Washington, D.C.: Operations Research Office, October 1949).

[84]Janis, ***Air War and Emotional Stress***, 98, 103, 106-107, 144.

[85]***Ibid.***, 100.

[86]George, "Emotional Stress and Air War," 12.

Further, the afflicted person's expectations of victory may diminish, and as his confidence waned the morale-crushing impact of bombardment would only grow worse.[87]

The Issues: given his discoveries, Professor Janis unwittingly provided an alternative approach to Ernest May's factionalism-based strategy (see below). According to Janis, the heavier an irregular bombardment raid, the higher the proportion of near misses, and thus the greater the disorganized (and maladaptive) behavior of those who immediately experienced the attack.[88]

There are, however, factors that undermine the utility of heavy and sporadic near-miss bombardment against civilian populations. Negative public attitudes, for example, are not necessarily followed by overt anti-government behavior.[89] Severely bombed civilians, rather than become contentious advocates of political change, typically become docile and depressed.[90] They suffer from the "law of mental

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[87]***Ibid.***, 21.

[88]The United States Bombing Survey (USSBS), despite the inconsistencies between its summary volumes and survey reports, largely supports Professor Janis. One USSBS report concluded that continuous heavy bombing did not produce decreases in morale proportional to the amount of bombing accomplished; it also determined that those who directly experienced the effects of air attack had much lower morale than those who experienced them indirectly. See United States Strategic Bombing Survey, ***The Effects of Strategic Bombing on German Morale***, Vol. I (Washington, D.C.: Government Printing Office, 1947), 33.

[89]Janis, ***Air War and Emotional Stress***, 127.

[90]George, "Emotional Stress and Air War," 18.

inertia," *i.e.*, they focus on personal survival and cling to the status quo. War weariness may appear, but it is questionable that those who suffer severely will apply political pressure against their government."[91]

If the near-miss option is not particularly effective against civilian populations, would it work when directly applied against an enemy army or leader(s)? In the first case, Stephen T. Hosmer and Group Captain Andrew Lambert, RAF, combine to argue that armies are psychologically coercible through near-miss and direct hit options if 1) they experience increasingly heavy and frequent bombardment that exceeds their expectations, 2) they are pinned-down and isolated, 3) they experience maximum discomfort and fatigue, 4) they develop a sense of expendability and hopelessness by being unable to retaliate, and 5) you give them a political or military way out of their predicament.[92]

In the case of leadership, J. T. Sink and Thomas Ehrhard plausibly argue that Colonel Khaddaffi's near-miss experience with American bombers in 1986 did precipitate a significant change in Libyan political behavior, at least

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[91]***Ibid.***

[92]Stephen T. Hosmer, ***Psychological Effects of U.S. Air Operations in Four Wars 1941-1991,*** (Santa Monica, California: RAND Corporation, 1996), xv-xxiii; and Group Captain A.P.N. Lambert, RAF, "The Psychological Impact of Air Power Based on Case Studies Since the 1940s," (Master's thesis, Cambridge University, 1995), 79-91.

temporarily. Rather than lapse into apathetic inertia, Khaddaffi retreated from his overt support of terrorists operating in Europe and the Middle East.[93] (Obviously, this characterization of events is monocausal and requires a level of predictability that still eludes airmen, despite the growing presence of precision weapons.) As Figure 8 summarizes, a Janis-based approach believes external threats, to include strategic bombardment, are just as coercive as internal threats; it believes external threats can have a direct impact, rather than an ill-defined indirect impact, on altering enemy behavior; and it believes internal opposition within an enemy nation actually impedes, rather than promotes, compliance with an external coercer's desires and demands. For those who agree with Janis, near-miss experiences may be a deliberate peacetime policy option, especially given the availability of brillant munitions and stealth.

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[93]Major Jerry T. Sink, "Coercive Air Power: The Theory of Leadership Relative Risk," Maxwell Air Force Base, Alabama: unpublished essay, USAF School of Advanced Airpower Studies, April 1993, 7-8; and Ehrhard, ***Making the Connection: An Air Strategy Analysis Framework***, 22-25.

Figure 8

One Theory of Aerial Coercion

	POLITICAL OUTCOME	TIMING	TARGET/OBJECTIVE	MECHANISM
JANIS	CHANGE POLICIES	IRREGULAR	LEADERSHIP OR POPULATION	NEAR MISS EXPERIENCES

If the Janis option rests on arguable assumptions, what are they? The weakness of the approach is that it is highly provisional and that the historical record does not support reasonable generalization. The cases available are ambiguous for two reasons--the forces working against compliance are relatively weak or there are additional factors that contribute to a change in behavior.

Thus, on the one hand, you can argue that aerial coercion typically works when external risks are high and internal risks are low or unequal. Neville Chamberlain, for example, feared the Luftwaffe and yielded to erman pressure at Munich. One year later, however, he refused to yield when Germany invaded Poland. His domestic political prestige now depended on preserving Polish sovereignty, regardless of the aerial threat posed by the Luftwaffe.

On the other hand, there are instances where aerial coercion works when both the external and internal risks are high. Seen from another perspective, The Libyan raid inspired a coup attempt that, working together with the actual attack, may have inspired Colonel Khaddaffi to curtail his overt support for international terrorism. Additionally, the February 15, 1991 attack on the Al Firdos bunker, in which U.S. bombs allegedly killed members of Iraqi security forces and their families, may have coerced Saddam Hussein to indirectly offer a conditional withdrawal from Kuwait, and avoid the wrath of previously untouched Iraqi elites.[94] Ultimately, the above examples may illustrate that different paradigms provide different answers.

2. The Leadership-Population Theory of Thomas Schelling.

The Theory: in the 1950s, American strategic bombing theory transformed itself into deterrence theory. As a

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[94]***Ibid.***, 6-8. It is Colonel Warden who argues that the attack on the bunker had a positive strategic impact. His assertion, however, is highly controversial. The presence of security forces in the bunker remains under dispute. Further, Saddam's behavior may have been motivated by an increase in external risks and not by domestic considerations. He did, after all, allow Republican Guard units to suffer without appreciably modifying his behavior, and they were a major source of his political support.

result, a division of responsibilities occurred between civilian elites and the U.S. Air Force. Strategic Air Command increasingly focused on developing mechanistic targeting plans for nuclear war, while the continued development of strategic theory became the responsibility of civilian strategists like Bernard Brodie, Herman Kahn, William Kaufman, Albert Wohlstetter, and Thomas Schelling. Schelling, as ***Arms and Influence*** (1966) confirms, was the Clausewitz of nuclear theorists and the godfather of flexible response, a theory Robert S. McNamara applied quite unsuccessfully against North Vietnam during the Second Indochina War.

For our purposes, Schelling's theory is best described in Chapter 4 ("The Idiom of Military Action") of ***Arms and Influence***. It remains applicable today, despite the almost universal revulsion by post-Vietnam era airmen and women against the gradual use of air power as an instrument of "vicious diplomacy." (Currently, however, in a unipolar world where diplomatic conditions are more akin to the 1920s and 1930s, and where air technologies are no longer blunt and necessarily murderous instruments of war, air planners

are once again exploring the possibilities of aerospace power as an instrument of schelling-like diplomacy.)

What then is Thomas Schelling's theory of armed conflict, as adapted to the use of conventional air power? Schelling begins by arguing that air power is the power to hurt. It is a bargaining chip that is most effective *when held in reserve.*[95] "The threat of violence in reserve," Schelling argues, "is more important than the commitment of force in the field".[96] It shapes the mind and expectations of an opponent, who is reminded that he or she still have something to lose.

This process is particularly important in a post-nuclear world where armed conflict has become "a competition in risk taking, a military-diplomatic maneuver with or without military engagement but with the outcome determined

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[84]Schelling defines the essence of bargaining as follows: it is "the communication of intent, the perception of intent, the manipulation of expectations about what one will accept or refuse, the issuance of threats, offers, and assurances, the display of resolve and evidence of capabilities, the communication of constraints on what one can do, the search for compromise and jointly desirable exchanges, the creation of sanctions to enforce understandings and agreements, genuine efforts to persuade and perform, and the creation of hostility, friendliness, mutual respect, or rules of etiquette. Thomas C. Schelling, ***Arms and Influence*** (New Haven, CT: Yale University Press, 1966), 136.

[96]***Ibid.***, 143.

more by manipulation of risk than by an actual contest of force."[97] By shaping the cost-risk calculations of an opponent, Professor Schelling hopes to make an enemy behave. The goal is not an adversary's destruction, but to exact good behavior and prevent further political mischief.

However, to coerce or compel an adversary with air power-based threats requires several things. First, any bargaining process requires discrete and qualitative boundaries that both sides can recognize as "conspicuous stopping places, conventions and precedents to indicate what is within bounds and what is out of bounds. . . ."[98] Second, all bargaining must be based on actions, actions and words, but never words alone. Third, communications must be simple and form recognizable patterns, except in those limited instances where you want to send a deliberately ambiguous message. If you do not meet these preconditions, Schelling observes, threat-based diplomacy will lack the "high fidelity" it needs to succeed. And if you and your opponent do not communicate in the same "language" or "currency," you both may spin out of control into war.

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[97] ***Ibid.***, 166.

[98] ***Ibid.***, 134-35, 164.

Wars in a post-nuclear world, however, are by definition limited. According to Professor Schelling, the combatants will ultimate commit themselves to some level of mutual restraint. As a result, current conventional wars retain a negotiatory character--they are "a bargaining process, one in which threats and proposals, counterproposals and counterthreats, offers and assurances, concessions and demonstrations, take the forms of actions rather than words, or actions accompanied by words."[99] Yet, while the bargaining continues, it is appropriate to deliberately manipulate the tempo of air operations. A gradualist approach, Professor Schelling observes, gives your enemy the opportunity to receive and respond to your signals. Most importantly, it gives him or her the opportunity to communicate a willingness to quit fighting, which is the ultimate point of Schelling's approach.

The Issues: the failure of gradualism in Vietnam seems to invalidate Thomas Schelling's vision of warfare as a vicious form of negotiation and diplomacy. On the other hand, critics of the Rolling Thunder campaign and other measured applications of air power conveniently ignore a key

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[99]***Ibid.***, 142.

passage in ***Arms and Influence***: "it is so important to know who is in charge on the other side, what he treasures, what he can do for us and how long it will take him, and why we have the hard choice between being clear so that he knows what we want or vague so that he does not seem too submissive when he complies."[100] Since the Johnson administration failed to know these things, it is fair to claim that American policy in Vietnam was a bastardized version of Schelling' vision, rather than the thing-in-itself.

As a result, Professor Schelling's problems go farther than a misplaced faith in gradualism. If airpower is to succeed as an instrument of vicious diplomacy and signal sending in the future, its proponents must recognize and adapt to the following problems.

1. Large government bureaucracies are not rational, unitary actors. They often lack the necessary subtlety or unity of purpose required to bargain violently for a prolonged period of time.

2. The concept of signal-sending wrongly assumes that messages are clearly given and received.

3. Diplomacy based on gradualism allows for adjustments, substitutions, and work-arounds by your opponent.

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[100]***Ibid.***, 175.

4. Diplomacy based on gradualism, rather than convey your reasonableness and flexibility, may convey a negative impression, *i.e.*, you may appear to lack resolve and/or be politically weak.

5. Diplomacy based on gradualism not only probes the political environment, it alters it. Therefore, the process of negotiation itself distorts the signals sent and received.

6. Diplomacy based on signal-sending wrongly assumes that the actors involved always perform costs-risks calculations that create identifiable breaking points.

7. Vicious diplomacy wrongly assumes that governments necessarily care about their people, and that they will change their behavior to spare them further suffering.

8. Vicious diplomacy tends to emphasize tinkering with the status quo. It does not readily involve revolutionary change.

9. Protractedness, in any guise, is not an American trait of American diplomacy, vicious or not. We as a nation may lack the capacity for prolonged signal sending.

Finally, there is one more issue to resolve--what is the preferred target set of a gradualist campaign? In Schelling's opinion, it is the enemy population--"Populations may be frightened into bringing pressure on the governments to yield or desist; they may be disorganized in a way that hampers their government; they may be led to bypass, or to revolt against, their own government to make

accommodation with the attacker."[101] The result, as Figure 9 illustrates, is an air strategy that advocates a gradual assault against an enemy population. The assault may then trigger a cost-benefit calculation by the enemy government that may lead to a change in political behavior. (Again, however, the theory assumes that the eight challenges listed above will not undermine mutaul comprhension and clarity.)

Figure 9

Two Theories of Aerial Coercion

	POLITICAL OUTCOME	TARGET	MECHANISM	TIMING
JANIS	CHANGE POLICIES	LEADERSHIP OR POPULATION	NEAR MISS EXPERIENCES	IRREGULAR
SCHELLING	CHANGE POLICIES	POPULATION [ARMY;LEADER]	FUTURE COSTS AND RISKS CALCULATIONS	INCREMENTAL ESCALATION

3. The Leadership "Theory" of Ernest May.

The Theory: in Chapter V of the ***Lessons of the Past***, Professor May looks at instances where governments tried to use aerial bombardment to coerce others. He identifies

[101] ***Ibid.***, 180.

three failures and two successes before 1945. In the case of Ethiopia in the 1930s, Benito Mussolini failed to compel negotiations by aerial chemical warfare. During the Sino-Japanese War, the Japanese conducted three aerial assaults a day to create terror and excite antiwar sentiment. Like Mussolini, the Japanese failed to secure a negotiated peace. Finally, Fascist air forces in Spain also failed to break Republican resistance. In all three instances, the air weapon proved to be an ineffective instrument of political coercion.

However, Professor May does identify two instances where aerial bombardment did contribute to desired political ends--Italy and Japan in World War II. In both cases bombardment contributed to a change in government and a break with the policies of the past.

But why did the air weapon have a political effect in the latter two cases and not in the previous three? The answer, according to May, was factionalism. Mussolini routinely pitted various political and bureaucratic factions against each other to retain ultimate power in Italy. At the same time, under-secretaries, bureau chiefs, staff officers, and party functionaries continued to plot against

him. They gathered strength while Italy experienced a series of military defeats and a decline in popular resolve. It was at this point that the bombing of Rome occurred. After the attack, two-thirds of the members in the Fascist Grand Council rebuked Mussolini. The bombing also inspired King Victor Emmanuel to unseat Mussolini, replace him with Pietro Badoglio and a cabinet of nonfascists, and set the stage for a separate peace. According to Professor May, Italy's foreign policy changed because its leadership changed. The actual bombardment of Rome, coupled with the fear of future attacks, contributed to these changes.[102]

The same factors also explain why strategic bombardment was successful against Japan. A deified emperor ruled over fragmented elites. Civil ministries, political parties, segments of the military, aristocrats, and intellectuals all refused to cooperate with each other. As a result, the key to change was Emperor Hirohito. His decisions to dismiss General Tojo in July 1944 and surrender in August 1945 were both long overdue. Yet those factions that pressured the Emperor to act were like those in Italy; according to May,

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[102]Ernest May, ***Lessons of the Past*** (New York: Oxford University Press, 1976) 134.

they were concerned bureaucrats, military officers who distanced themselves from the policies of the past, and politicians working to unseat blameworthy rivals. Like in Italy, actual bombardment and the fear of future bombardment "had some effect" in changing Japanese foreign policy.[103]

Professor May repeatedly claims that his work is more a thought-piece than a theory. He does suggest, however, that nations with fragmented ruling elites are vulnerable to aerial coercion. Strategic air attacks may contribute to the installation of new leaders who have little or no stake in past policies, and thus are willing to change them. But which groups can assume power and adopt new policies? If they exist, can aerial bombardment either strengthen or weaken them? On the latter point, May is largely silent. He suggests that air power is just one factor among many that coalesce, under historically unique circumstances, to trigger a change in an enemy nation's leadership structure. How air power contributes to this change depends on the situation and the interpretive skills of the air planner.

However, Professor May is quite clear about which leadership factions are vulnerable to aerial suasion and

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[103]***Ibid.***, 137.

capable of dislodging others. Given their access to uncensored information, it is the "pessimists" who best recognize the dangers of a particular policy, and thus can agitate for change. They include members of foreign ministries, intelligence bureaus, and internal security forces. They include ambassadors, ministers and civil servants concerned with domestic affairs, intelligence analysts, and future forecasters. They also include internal security officers, military leaders not associated with current policies, and politicians eager to secure their own futures.[104]

By analyzing the above factions and how they behaved in Italy and Japan, Professor May draws three conclusions: 1) to reduce an enemy's commitment to a particular policy, multiple levels of a bureaucracy must become pessimistic about its costs, 2) those associated with foreign affairs and intelligence agencies are typically the first to recognize the weaknesses of a particular policy, and 3) the logical advocates for change are those who work in four areas--foreign relations, internal security, intelligence, and even those who work in the domestic economy.

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[104]***Ibid.***, 132, 134.

Keeping these conclusions in mind, can aerial bombardment promote disaffection between (and among) bureaucrats and ruling elites? Can air power nudge dissidents to precipitate a leadership (*i.e.*, policy) change? According to May, there is some evidence to suggest that the threat of bombardment "might contribute to bureaucratic anxiety. . . and hence enhance in some small degree the chances of governmental change resulting in a change in policy."[105] Therefore, as Figure 10 illustrates, a series of air assaults against an enemy nation's leadership, might lead to changes in governments or policies. The mechanism of change involves exploiting factionalism within (and between) politico-bureaucratic elites to create conditions that allow "pessimists" to restructure the government and its policies.

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[105]***Ibid.***, 140-42. Thomas Fabyanic repeats Professor May's conclusions, although more emphatically, in "Air Power and Conflict Termination," in ***Conflict Termination and Military Strategy: Coercion, Persuasion, and War***, eds. Stephen J. Cimbala and Keith A. Dunn (Boulder, Colorado: Westview Press, 1993). According to Fabyanic, air power destroyed, "beyond any doubt," the will of the Italians and the will and ability of the Japanese to wage war. In both instances, the loss of will then "brought about a change of government and new leaders who were not committed to a continuation of the war." Significantly, Fabyanic supports these bald assertions by citing The Lessons of the Past, i.e., he depends upon the authority of another historian to "prove" his point. See p. 155.

Figure 10

Three Theories of Aerial Coercion

	POLITICAL OUTCOME	TARGET	MECHANISM	TIMING
JANIS	CHANGE POLICIES	LEADERSHIP OR POPULATION	NEAR MISS EXPERIENCES	IRREGULAR
SCHELLING	CHANGE POLICIES	POPULATION [ARMY;LEADER]	FUTURE COSTS AND RISKS CALCULATIONS	INCREMENTAL ESCALATION
MAY	CHANGE LEADERS OR POLICIES	LEADERSHIP	EXPLOIT FACTIONS	INCREMENTAL

The Issues: May's endorsement of aerial bombardment as an instrument of coercion acknowledges that change usually occurs, in the words of Albert Hirschman, "as a result of a unique constellation of highly disparate events and is therefore amenable to paradigmatic thinking only in a very special sense."[106] However, despite Professor May's keen awareness of the dangers of theorization, his provisional model of aerial coercion does raise three issues best dealt with here. The issues center on 1) the relationship between cause and effect in aerial bombardment, 2) the distinction between external and internal threats to a nation, and 3) the recent impact of modern technology, to include precision

[106]Hirschman, "The Search for Paradigms as a Hindrance to Understanding," 339.

guided munitions (PGMs) and stealth systems, on political coercion.

Issue 1: How does aerial bombardment, via the unspecified pressures it exerts, yield specific political effects? What ***specific*** targets do you attack to promote factionalism between bureaucratic pessimists and those who actually dictate policy? How can air power empower one faction and yet weaken another? On these questions of cause and effect, between the instruments of war and the ends desired, Professor May is silent. Although he tries to link Italian and Japanese shifts in behavior to aerial assaults, the "how" of the process remains unclear. Like his predecessors, Professor May thus ***assumes***, rather than empirically proves, that aerial bombardment facilitated the restructuring of enemy leadership elites and their policies.

May argues, for example, that the restructuring of the Japanese government and its policies began with General Tojo's forced resignation in July 1944. However, he also claims that the anti-Tojo conspirators needed over a year to redirect government policies and sue for peace. Since the timing of American aerial bombardment and the restructuring of the Japanese government and its policies did not truly

coincide, it is impossible to prove (and demonstrate) that bombardment had little more than "some effect" in introducing change.

Further, Professor May's cause and effect treatment of events requires two things--that some of the conspirators of 1944 were "moderates" and that they were nonincumbents who disagreed with the direction of Japanese foreign policy. But as May also admits, the idea of high-ranking "moderates" operating within the Japanese government may be a postwar fiction promulgated by Prince Konoye and other former leaders who wanted to distance themselves from the ruthless colonialism and militarism of the past.[107] As George Quester rightly observes, "May's distinction between incumbents and nonincumbents may stretch political reality a little too much, for many political coups consist of some of the leaders conspiring to oust the rest."[108] Yes, Quester argues, General Tojo fell from power, but "some very

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[107]See Saburo Ienaga, ***The Pacific War 1931-1945*** (New York: Pantheon, 1978). After the War, Konoye portrayed himself as a patriot and anticommunist who quarreled repeatedly with the Army. In fact, the Nuremburg trials may have inspired Konoye's new self-image.

[108]George H. Quester, "The Impact of Strategic Air Warfare," ***Armed Forces and Society*** 4 (February 1978), 196.

powerful elements of the incumbent establishment remained just as powerful afterward."[109]

Ultimately, Ernest May's treatment of aerial coercion hearkens back to Jomini and the rationalists; it is elegant and symmetrical, but its historical foundations are suspect. To his credit, May admits as much. He acknowledges that the cases he analyzes--Italy and Japan--"are few and different and that the evidence is dubious on many points."[110] In fact, it is sufficiently dubious for multiple historians to conclude that strategic bombing did ***not*** inspire Japanese leaders (i.e. the Army) to reverse course in August 1945. Instead, it was Russia's entry into the war (Paul Kecskemeti), the atom bomb (Herbert Feis), or our naval blockade, coupled with the Soviet invasion of Manchuria (Robert Pape), that dictated the timing of surrender. These interpretations, although a limited sample, confirm that there is no consensus on why it took over a year to translate Japan's obvious military defeat into war termination. Professor May's claim--that newly empowered "moderates" needed over a year to reverse past policies--is

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[109]**Ibid.**

[110]May, ***The Lessons of History***, 142.

only one interpretation among many. Yet, the relationship he establishes between air attack and political behavior depends on it.[111]

Issue 2: Professor May appears to believe that external threats to a leader's power or survival are less credible and less compelling than threats that come from within his or her own country.[112] He seems to agree with Kenneth Waltz, who warns against confusing external means with internal control. According to Waltz, using external force is merely "a means of establishing control ***over*** a territory, not of exercising control ***within*** it."[113] External force, for example, cannot pacify a nation and establish internal political rule. These tasks, Waltz argues, involve processes that are distinct from those triggered by the external use of force, including air power. As a result,

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[111]See Leon Sigal, ***Fighting to a Finish: The Politics of War Termination in the United States and Japan, 1945*** (Ithaca, New York: Cornell University Press, 1988), 1-25; and Robert A. Pape, "Why Japan Surrendered," ***International Security*** 18(Fall 1993), 154-201.

[112]May cites Mussolini's Ethiopia campaign, the Sino-Japanese War, the Spanish Civil War, and the war in Vietnam to buttress his argument.

[113]Kenneth Waltz, ***Theory of International Politics*** (Reading, Massachusetts: Addison-Wesley Publishing Co., 1979), 189 (emphasis added).

those theorists who claim that a specific external action (air attack) can lead to a particular internal effect (a change in leadership or policy) are doomed to fail. May tries to avoid this problem, as defined by Waltz, by establishing a hierarchy between internal and external threats.

May's hierarchicalism allows him to avoid the "causality trap," and thus sidestep the problem of accurate prediction. The "causality trap" equates military power with control, and with the ability to coerce others. As Waltz argues, however, equating power with control does not prove that one leads to the other. "To define 'power' as 'cause' confuses process with outcome. To identify power with control is to assert that only power is needed in order to get one's way."[114] Both assumptions, which characterize the thinking of virtually all air power thinkers, are dangerous. They assert that an intended act and its results are identical. In any scenario, however, the *context* of an action, along with *an opponent's reaction*, will yield unanticipated political results. Because he believes these factors are important, Professor May concludes that faction-

[114]***Ibid.***, 191.

driven internal threats are more credible than external threats, *i.e.*, strategic bombardment. The latter can only prod, in some ill-defined way, internal groups to act. As a result, it can only have an indirect effect on what leaders value most--personal survival and the preservation of individual power.

However, creating a hierarchy of threats may introduce as many problems as it solves. It remains unclear, for example, just how bombardment indirectly shapes political behavior. Does it actually motivate leadership factions to reverse themselves and reject the status quo, or does it merely provide a pretext for already disaffected groups to act? More importantly, how does bombardment specifically (and indirectly) increase the influence of one political faction at the expense of another? May cannot answer the last question because of the assumptions he makes. He assumes, for example, that "pessimistic" moderates are more flexible (*i.e.*, conciliatory) than those who cling to the status quo. The hard-liners, in contrast, do not always understand the security problems they face. They misperceive the motives of others, and since offensive strategies like strategic bombardment are open to a wider

range of interpretations than defensive strategies, hard-liners may overestimate the danger posed by external threats. As a result, May argues, they adopt competitive (rather than cooperative) policies.

Unfortunately, by establishing a simple dichotomy--flexible moderates against inflexible hard-liners--May oversimplifies the relationship between strategic bombardment and political influence. He does not clearly identify (or analyze) those myriad factors that directly shape an opponent's external policies, nor does he relate them to the indirect impact of strategic bombardment. In other words, he does not ask six basic questions.

1. Who actually controls the foreign policy-making process?

2. What are the arguments competing bureaucratic factions use to support their policy prescriptions?

3. How skillful is each faction in promoting its prescriptions?

4. What is the level of enemy understanding of our own policies and motives?

5. Which interpretation of our motives dominates the factional debate?

6. How do domestic factors influence the tug of war over whether to compete or cooperate with an external foe?[115]

[115]Professor Charles Glaser raises these questions in relation to nuclear weapons and our previous security dilemma

Because Professor May does not answer these six questions, he misses a key point--the indirect impact of strategic bombardment depends on how enemy elites see their own policies. Strategic air attacks may indirectly tumble hard-liners from power, but only if moderates successfully blame them for the attacks. Therefore, the role of strategic bombardment is twofold--to cause unacceptable suffering and to eliminate any doubt over the root cause of the suffering. If hard-liners successfully portray strategic bombardment as undeserved and an expression of enemy ill will, their power will actually grow. The air attacks will undercut those who want to change the status quo by making them appear self-interested and disloyal. However, if moderate "pessimists" successfully portray the attacks as a reaction to the hostile policies promoted by those in power, it may result in political change. In this case, the hard-liners are not guiltless victims; their wounds are largely self-inflicted. Again, the key is how the enemy sees his own policies and how strategic

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with the former Soviet Union. The questions obviously apply to conventional air warfare as well. See Charles L. Glaser, ***Analyzing Strategic Nuclear Policy*** (Princeton, New Jersey: Princeton University Press, 1990), 81-82.

bombardment aids and abets the control of this self-perception by moderates.

Issue 3: writing in the 1970s, May understandably failed to anticipate the current revolution in military affairs. Because of superior command and control technologies, precision guided munitions and stealth technology, the ability of air power to cause "bureaucratic anxiety" and either strengthen or weaken the power of "pessimistic" enemy factions may have grown exponentially. As a result, May's "causality trap" may not be as pronounced as it once was. Precise external attacks may now *directly* impact the internal political dynamics of an enemy nation. If so, air planners may exploit factionalism in a different way, as the next section will now show.

Professor May's hierarchical theory minimizes an obvious point: a change in leadership or political behavior (or both) may be the consequence of relative risk calculations made by a leader who sees internal and external threats as ***equally*** important and credible. If both types of threats are equally credible, then one can argue the following: 1) a leader is coercible when the threat against his or her personal or political survival is greater from

external sources than internal sources; 2) a leader is not coercible if the threat from internal sources is higher than external sources; and 3) the leader is not coercible when the risks of compliance are equal to the risks of noncompliance.[116] Obviously, these conclusions clash with Professor May's indirect approach. They assume that serious internal challenges to a leader's power and authority will only stiffen his or her resolve.

If the above is true, air planners should *not* indirectly aid and abet disaffected groups of "pessimists." Professor May's "theory" depends on unpredictable (and unmanageable) enemy factions to promote change. These factions, however, may actually goad an enemy leader to crush them while they are relatively weak. As a result, the air planner should raise the perceived external risks to a leader's personnel and political survival to a higher level than the perceived internal risks.[117] The logic of this approach is as follows: if a leader confronts both external and internal threats, he or she will try to reduce those

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[116]See Sink, "Coercive Air Power: The Theory of Leadership Relative Risk," 2.

[117]***Ibid.***

threats that he or she has the most control over, including the elimination of opposition groups. Seen from this perspective, internal factions actually inhibit a leader's willingness to comply with external goals; i.e., external demands "***will succeed only when conditions are safe for the leader to be coerced***, and that means lower relative internal risks of compliance."[118] Thus, the external actor must do the opposite of what Professor May recommends. The actor must not rely on unmanageable internal "pessimists" to coerce an opponent to behave properly. Nor should he or she allow the perceived internal threats to an enemy rise to a level equal to or higher than external threats. If they do, calculated intransigence and repression is more likely to occur than a change in leadership or policy.

If internal opposition within an enemy nation actually impedes political change, is there an external, leadership-oriented option available instead? In fact, there are two immediate options worth considering.

The first one is George Quester's "expectancy hypothesis," as explored by Martin Fracker.[119] The

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[118]***Ibid.***, 3.

[119]See Major Martin L. Fracker, "Psychological Effects of Aerial Bombardment," ***Airpower Journal*** VI (Fall 1992), 56-67; and

foundations of the hypothesis are as follows: 1) the expectations of those who experience an air attack are more important--as psychological variables--than their capacity (and willingness) to endure pain, and 2) information that comes as a surprise has greater emotional impact than unsurprising data.[120] With these two propositions firmly established, Quester's "expectancy hypothesis" suggests that if the ferocity of an air attack exceeds the expectations of those attacked, they might suffer a psychological defeat and abandon future hostilities.[121] Naturally, Quester's hypothesis raises multiple questions, a majority of which also apply to Professor May's provisional theory. What is the threshold that triggers feelings of despair and defeat in an opponent? How much bombardment is too much? Are there other factors--cultural values, the nature of the government, political objectives, the dynamics of war termination--that raise or lower the threshold of your

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George H. Quester, "The Psychological Effects of Bombing on Civilian Populations: Wars of the Past," in ***Psychological Dimensions of War***, ed. Betty Glad (Newbury Park, California: Sage Press, 1990), 201-14.

[120]Fracker, "Psychological Effects of Bombardment," 55.

[121]***Ibid.***, 59, 65. The attack (or campaign) must typically be massive and unrelenting.

opponent's resolve? Lastly, how long will the shock of exceeded expectations last, and thus possibly impact political behavior?[122] These questions confirm that the cross-cultural and psychological impacts of air bombardment are still not totally understood. Nevertheless, to disrupt the expectations of leadership elites may bear fruit, as might Dr. Janis's approach, as already discussed.

4. The Leadership Theory of Colonel John Warden.[123]

America's defeat in Vietnam did inspire self-criticism in its military, although the Air Force lagged behind the other services. Over time, however, some Air Force leaders concluded that they had not been Clausewitzian enough in their thinking.[124] They had tried to fight a conventional

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[122]***Ibid.***, 59, 61-62.

[123]John Warden graduated from the U.S. Air Force Academy in 1965 and subsequently flew 266 combat missions as a forward air controller in Southeast Asia. After commanding the 36th Tactical Fighter Wing, he returned to the Pentagon in 1988 and eventually served as the Air Staff's Deputy Director for Warfighting, Directorate of Plans. During this period Colonel Warden and others helped create the Air Force's new "Global Reach, Global Power" doctrine. He also headed CHECKMATE, the planning cell that devised the strategic air campaign (INSTANT THUNDER) conducted against Iraq. Subsequent to the Gulf War, Colonel Warden served as a special assistant to Vice President Quayle on technology-related issues, and as commandant of the USAF Air Command and Staff College from 1992-1995.

[124]See Donald J. Mrozek, ***The US Air Force After Vietnam*** (Maxwell Air Force Base, AL: Air University Press, December 1988).

war, with its emphasis on sortie rates and other mismeasures of merit, against what were largely insurgents. Reciprocally, they had neglected the subtle politico-military dimensions of an overtly political war.[125]

Like the Marine Corps, the U.S. Air Force's reaction to Vietnam was a return "to the basics." For example, seminars on Carl von Clausewitz appeared in the Air War College curriculum for the first time. In turn, warrior-scholars like Perry Smith, John Boyd, Thomas Fabyanic, and Alan Gropman now argued that air strategy was a "mental tapestry of intentions" frustrated by the unpredictability of war. They also concluded that airmen should not subscribe to individual theories of air power, particularly those that overstressed the importance of technology in war. Instead, they should contemplate a variety of theories, and thus avoid the false certainties that beclouded us in Vietnam. Lastly, the reformers argued much like Moltke the Elder that airmen should focus on theory only in a gross fashion. Like Moltke, they claimed that each war is unique and that an

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[125]See Andrew F. Krepinevich, ***The Army and Vietnam*** (Baltimore, MD: Johns Hopkins University Press, 1986).

enemy's vulnerabilities are culture-specific and identifiable only ***after*** aerial attacks.

By his own admission, John Warden succumbed to the above trends. He questioned his earlier faith in technology and concentrated on the psychological and political dimensions of war. However, Colonel Warden felt uncomfortable with the mystical, romantic dimensions of the "Clausewitz Mafia." Clausewitz was right when he talked about fog, friction, and morale; he was right, though, in a time when:

> communications were almost non-existent; weapons had little more range or accuracy than those of the Roman legions; most movement was at a walking pace; battles were won or lost depending on the outcome of tens of thousands of almost personal encounters between soldiers who could see each other when they fired; and when war was largely confined to the clash of men or ships at a limited point in time and space.[126]

In Napoleonic warfare it was impossible to separate the physical from the intangible dimensions of war, although the latter was "to the physical as three is to one." However, in the 1990s, Warden argued, with the advent of stealth technology and precision guided munitions, the equation had changed--the physical and intangible elements of war were

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[126]Colonel John A. Warden III, USAF, "The Enemy as a System," ***Airpower Journal*** IX (September 1995), 42.

now at least co-equal.[127] In fact, we could now put the intangibles of war--chance and morale, fog and friction--into a distinct category, separate from the physical. According to Colonel Warden:

> In today's world strategic entities, be they industrial state or guerilla [sic] organization, are heavily dependent on physical means. If the physical side of the equation can be driven close to zero, the best morale in the world is not going to produce a high number on the outcome side of the equation. Looking at this equation, we are struck by the fact that the physical side of the enemy is, in theory, perfectly knowable and predictable. Conversely, the moral side--the human side--is beyond the realm of the predictable in a particular situation because humans are so different one from another. Our war efforts, therefore, should be directed primarily at the physical side.[128]

The above quotations illustrate three key points about John Warden's vision of war. First, Colonel Warden embodies a necessary correction to the post-1975 overemphasis on the psychological and moral dimensions of air warfare. The Clausewitz revival of the late 1970s yielded mixed results, to include the growth of theoretical nihilism among airmen. There were individuals who felt that detailed, systematic theorization was futile, if not outright irrelevant. They

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[127]Warden echoes James Spaight, who claimed that "whatever Napoleon may have said, the material factors are in . . . [air] warfare at least as important as the moral." See Spaight, ***Air Power in the Next War***, 129.

[128]Warden, "The Enemy as System," 43.

argued that air theory and strategy was not universal; instead, it required constant improvisation on an ad hoc basis. Further, reformers like Jeff Record, Bill Lind, and even John Boyd questioned the importance of technology in war. They stressed quantity as well as quality in weapons development. Technology was important, the reformers argued, but it was no panacea.

Colonel Warden flirted with the above ideas, but he ultimately returned to his roots. He recalled that war is a mental ***and*** a physical activity. He rejected the Clausewitzian dictum that "No degree of technical development and scientific calculation will overcome the human dimension in war."[129] Instead, Warden stressed anew that a potential opponent depends on ***physical*** resources to exert his or her will. If these physical resources disappear or are unavailable, moral factors alone cannot carry the day. The tangible components of war matter just as much as the intangible components, if not more so. As a result, Colonel Warden repeatedly stresses the physical and technological dimensions of war in his writings and presentations.

Second, Colonel Warden not only emphasizes the physical nature of war, he also believes that precision guided munitions make future wars knowable and predictable. PGMs

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[129]Fleet Marine Force Manual 1 (FMFM-1), ***Warfighting*** (Washington, D.C.: Headquarters United States Marine Corps, 6 March 1989), 10.

have changed the nature of warfare. Past wars were "probability events" where opponents saturated each other with munitions and hoped to kill enough men to trigger a retreat or surrender. In short, "Probability warfare was chancy at best. It was unpredictable, full of surprise, hard to quantify, and governed by accident."[130]

With the growing use of precision weapons in Desert Storm, however, war moved into the predictable.[131] Strategic air power can now, in the words of Edward Luttwak, "paralyze governments, incapacitate armies, and destroy valuable assets at will."[132] And since "all countries look about the same at the strategic and operational level," henceforth we can accurately predict weapons effects and munitions requirements in any conflict.

Lastly, Colonel Warden's emphasis on technology and precision directly challenges the long-standing pacifist

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[130]John A. Warden III, "Thinking Across Historical Discontinuities," ***The American Warrior***, eds. Chris Morris and Janet Morris (Stamford, Connecticut: Longmeadow Press, 1992), 204.

[131]The Vietnam conflict provided a foretaste of predictability in war. For a description of early laser-guided munitions and their nascent contribution to probability warfare see Lon O. Nordeen, Jr., ***Air Warfare in the Missile Age*** (Washington, D.C.: Smithsonian Institution Press, 1985).

[132]Edward Luttwak and Stuart Koehl, ***The Persian Gulf and the Renaissance of Strategic Bombardment***, unpublished manuscript, 1991, Chapter V ("The Future of Strategic Air Power"), 24. This manuscript reflects Dr. Luttwak's enthusiastic, largely uncritical acceptance of Colonel Warden's theories of air power immediately after the Gulf War.

belief that war is outdated. Modern pacifists assume that all conventional wars are protracted and bloody, and too lethal to serve as effective political instruments.[133] They also assume that conquest does not pay.[134] John Warden, in contrast, believes the opposite--air power is the quintessentially American form of war; it uses mobility and high technology to achieve quick, relatively bloodless victories in conventional wars.[135] As a result, air warfare ceases to be an unconscionably blunt political instrument or an aberration. Instead, it becomes a supple way for the United States to maintain its dominance, and "If the US is to maintain its dominance, it must maintain an aura of invincibility. In other words, it should never lose."[136]

In the early 1990s Colonel Warden coalesced the above beliefs into a series of working propositions that not only were the foundation for the more recent assertions found in Figures 6 and 7, but which then yielded a modern theory of air power. The working propositions were as follows:

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[133]See Carl Kaysen, "Is War Obsolete? A Review Essay," ***International Security*** 14 (Spring 1990), 42-64.

[134]For a dissenting view see A. T. Mahan, ***Armaments and Arbitration*** (New York: Harper and Brothers, 1912).

[135]John A. Warden III, "Employing Air Power in the twenty-first Century," in ***The Future of Air Power in the Aftermath of the Gulf War***, eds. Richard H. Schultz, Jr. and Robert L. Pfaltzgraff, Jr. (Maxwell Air Force Base, AL: Air University Press, July 1992), 61.

[136]John A. Warden III, "Yugoslavia-Opportunity and Risk," unpublished memorandum, 29 November 1992, 4.

1. All organizations are fragile at the strategic level. As a result, they are subject to compellence and coercion.

2. Attacking enemy systems is preferable to attacking their component parts.

3. It is fatal to lose strategic and operational-level air superiority.

4. Strategic air attack is an important component of war; it usually ignores enemy military forces.

5. Parallel warfare creates devastating effects (i.e., airmen can now assault a wide variety of targets simultaneously rather than serially. Simultaneity, in turn, compresses combat operations in time and space. The enemy's ability to react collapses, and strategic paralysis, rather than physical destruction, occurs.)

6. Information at the strategic and operational levels of war is critical (i.e., information dominance is essential in serial and parallel warfare.)

7. Precision weapons are valuable; they minimize the impact of fog and friction in war.

8. Stealth and precision weaponry have redefined the principles of mass, maneuver and surprise. A small number of weapons can now create their own mass. Further, mass and maneuver are no longer competing principles of air power--each principle now complements the other.

9. Air power can provide the shock effect previously reserved for land-based armor and artillery.

10. The application of asymmetric force is now viable.

11. Surface forces at the operational level of war are fragile; they require elaborate (and vulnerable) organizational support. They also require wide-ranging logistics support.

12. The aerial "occupation" of a country is now possible.

13. Americans dislike large casualties on either side of a conflict. The value of stealth and precision guided munitions is that they are "clean"--they help minimize the brutality of war. Further, they typically contribute to the strategic paralysis of an opponent rather than his or her destruction.

14. We are at the beginning of a Military-Technical Revolution [now the RMA]; it will perpetuate itself indefinitely. As a result, the U.S. military must stay one military-technical revolution ahead of its closest competitors (in particular systems).

The above propositions provided a foundation for John Warden's Five Rings Model of strategic (and operational) air warfare, which he developed in the late 1980s and then garnished with his "System of Systems" concept from 1992-1995.

According to Colonel Warden, the point of a strategic air attack is twofold: to cause "such changes to one or more parts of the enemy's physical system that the enemy decides to adopt our objectives," or to make it physically impossible for anyone to oppose us.[137] The target of such an attack, however, is ***the entire enemy system***, and not just military forces. "We must think of the enemy as a system

[137]Warden, "The Enemy as System" 43.

composed of numerous subsystems," Colonel Warden argued, "and if we address the system properly, its military forces will be left as a useless appendage" in war, unsupported by other sources of power.[138] In short, the Five Rings and System of Systems Models advocated an "inside out" approach to war. They were updated versions of the classic air theories of the past, which advocated flying over an opponent's defenses and striking at vital centers.

Regardless of the permutations in his thinking, Colonel Warden never wavered on what was the key ring of an enemy system. Since all strategic systems relied on human beings to guide and direct them,

> The most critical ring is the command ring because it is the enemy command structure, be it a civilian . . . or a general. . . , which is the only element of the enemy which can make concessions, that can make the very complex decisions that are necessary to keep a country on a particular course, or that can direct a country at war.[139]

Given the importance of leadership, the essence of air warfare is therefore to apply intolerable pressure against an opponent's command structure, either civil or military

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[138]***Ibid.***, 2, 14.

[139]***Ibid.***, 15; see also Warden, "Air Power in the Twenty-first Century," 62-63, 65, 68.

(see Figure 11). The pressure will then lead to a change in enemy leaders, or at least a change in their policies. Airmen can accomplish this objective, Colonel Warden argued, by employing a decapitation strategy, which involves three options: killing specific enemy leaders, isolating them from their political base, or isolating them from fielded military forces.[140] (If you rob a society or army of its "brain," Warden claimed, it will topple into disorder. Too bad that societies and armies are not closed systems.) Parallel warfare can enhance this process by compressing military operations in time and space. The result, if we apply the Second Law of Thermodynamics to warfare, is strategic paralysis. Enemy leaders (or their successors) can either suffer its devastating effects, or they can make concessions and/or change their political behavior.

The Issues: is Colonel Warden's Five Rings Model too mechanistic? Yes. Is it an example of technological determinism? Yes, but John Warden does try to infuse some

[140]According to Robert Pape, the U.S. Air Force unsuccessfully tried all three options in the Gulf War. Neither Saddam Hussein nor 42 other top government/military leaders were captured or killed during the war; the Bath Party did not splinter apart or overthrow its leadership; and as previously ignored JSTARS tapes confirmed in 1993, there were organized large-scale movements of Iraqi troops in the KTO just one week prior to the ground war.

flexibility into his theory. He admits that the individual importance and resiliency of his systems varies from one society (and one historical period) to another. Second, he agrees that it is extremely difficult to operate directly and successfully against single-leader states or organizations. Consequently, it is normally necessary to attack an opponent's inner rings--leadership, organic essentials, and infrastructure--to induce strategic paralysis and change political behaviors. Lastly, Colonel Warden acknowledges that it may not be possible to reach anything more than populations and military forces by military means. For those states that cannot reach an enemy's inner strengths or vulnerabilities, the only options they have are indirect attacks via psychological or unconventional means.

The above disclaimers help to reconcile theory with reality, but even in retirement Colonel Warden remains committed to the idea that targeting leadership is of paramount importance in air warfare. He further retains a mid-Victorian faith in technology and a view of nation-states as rational and unitary actors. He minimizes the role of cultural and religious factors in his theory, despite his

balming words otherwise. He is quietly hostile towards the use of airpower in joint operations, and he ignores the fact that leadership targeting can degenerate from policy into personal vendetta, as in the case of General Addid in Somalia. Colonel Warden dismisses these concerns because, as Figure 11 illustrates, he is theological in his faith that devastating (and simultaneous) air attacks against primarily leadership targets will sever a state or organization from its "brain," and subsequently induce strategic paralysis. A change in leadership and/or policies would then inevitably follow.

Figure 11

Four Theories of Aerial Coercion

	POLITICAL OUTCOME	TARGET	MECHANISM	TIMING
JANIS	CHANGE POLICIES	LEADERSHIP OR POPULATION	NEAR MISS EXPERIENCES	IRREGULAR
SCHELLING	CHANGE POLICIES	POPULATION [ARMY;LEADER]	FUTURE COSTS AND RISKS CALCULATIONS	INCREMENTAL ESCALATION
MAY	CHANGE LEADERS OR POLICIES	LEADERSHIP	EXPLOIT FACTIONS	INCREMENTAL
WARDEN	CHANGE LEADER(S)	LEADERSHIP + 4 RINGS	DECAPITATION AND/OR STRATEGIC PARALYSIS	HYPERWAR: COMPRESS TIME/SPACE

5. The "Theory" of Robert Pape: First Kill the Army.

The Theory and One Significant Issue: In ***Bombing to Win*** meditates at length about the coercive use of airpower in war. However, of the five post-1945 thinkers addressed here, his musings are the least amenable to divining a "theory" of aerospace power. Still, there is a basic message available. The key to success in war is not punishment or denial, Pape argues, but military strategy--specifically the interaction between your strategy and the vulnerabilities of your victim's strategy. No one approach is always best, Pape continues, but you should actively pit the strengths of your military scheme against the particular vulnerabilities of your opponent's. These vulnerabilities, however, are not beyond your control. You should undermine your victim's confidence in his or her own military solutions, which historically have centered on the control of territory. If you can force your opponent to perform a cost-risk analysis over what it will cost to retain contested territory, and if you have successfully undermined his or her military confidence in retaining it, then successful coercion will occur.

Clearly, the Pape model assumes that territory will remain the ultimate goal of wars between nation-states, and that fielded military forces will remain the primary instrument of occupation, and that the aerospace-based coercion of these forces will occur in conventional war. If the reader accepts these assumptions, then Pape's "theory"

acts as a necessary reminder to the other four theorists in Figure 12 that their leadership-centered theories of aerospace power ignore fielded military forces at their peril.

Figure 12

Five Theories of Aerial Coercion

	POLITICAL OUTCOME	TARGET	MECHANISM	TIMING
JANIS	CHANGE POLICIES	LEADERSHIP OR POPULATION	NEAR MISS EXPERIENCES	IRREGULAR
SCHELLING	CHANGE POLICIES	POPULATION [ARMY;LEADER]	FUTURE COSTS AND RISKS CALCULATIONS	INCREMENTAL ESCALATION
MAY	CHANGE LEADERS OR POLICIES	LEADERSHIP	EXPLOIT FACTIONS	INCREMENTAL
WARDEN	CHANGE LEADER(S)	LEADERSHIP + 4 RINGS	DECAPITATION AND/OR STRATEGIC PARALYSIS	HYPERWAR: COMPRESS TIME/SPACE
PAPE	RAPID	MILITARY FORCES	THWART MILITARY STRATEGY	YIELD TERRITORY

CONCLUSION

This report attempted to accomplish three things. First, it focused on the problem of airpower language, both in the narrow and epistemological sense of the word. It argued that the average Air Force officer still lacks a totally effective language or lexicon to develop and analyze aerospace theory properly. The root causes of this problem, as Chapter One highlighted, are a long-standing dependence on Army-centered terms and definitions, and more importantly, the entanglement of airpower thinking within the two dominant "languages" of war created in the modern era--the pseudo-scientific language of 18th century physics and the Enlightenment, and the 19th century language of military romantics, who stressed the irrationality of war. Both lexicons were not totally "reality inclusive," and because they naturally centered on surface warfare, they trapped airpower theorists in a prison house of language. Airpower theorists then compounded the problem by adopting the vocabulary of rationalism, as developed by Antoine-Henri Jomini and others, instead of the more "reality inclusive"

(but vague) language of the romantics, as exemplified by Carl von Clausewitz. As a result, Chapter One concluded, air thinkers have always relied on adopted languages that not only circumscribed their thinking, but also included an increasingly inadequate collection of terms and categories to describe the nature of air warfare and its objectives. The result, therefore, was a growing intellectual paralysis in airpower theory.

After providing a language-centered explanation as to why airmen and women lost the ability to articulate concepts of airpower employment, both to others and to themselves, Chapter Two of this report attempted to repair the damage, at least in part. It provided a process-oriented model that budding aerospace theorists and planners can use to differentiate one theory from another, and to build their own theories in the future. Further, the report stressed that the model is adaptable. Army, Navy, and Air Force aviators can all use it, and not just for the independent application of airpower in conventional war. They can also use it to develop theories of employment across the spectrum of conflict, and in peacetime operations involving coercive

diplomacy among states, the modification of international or domestic opinion, or the setting of legal-moral precedents.

Lastly, after providing a model on how to shape discussions about aerospace theory in the future, Chapter Three sought to accomplish a simple two-part goal--to demonstrate the use of the model and, in the process, systematically introduce airmen and women to fifteen different theories of aerospace power. In short, Chapter Three was part model demonstration, part history lesson, and part vocabulary enrichment exercise for those who have limited "language" capabilities in aerospace theory, but who need a basic introduction to the subject. With this primer in hand, everyday service members can begin to fill the theoretical gaps that still abound in aerospace theory.

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